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UTTAR PRADESH SUBORDINATE SERVICES SELECTION COMMISSION

FOREST GUARD AND WILDLIFE GUARD Mains Exam

Part - I

Forestry and Environmental Science

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Chapter-Wise MCQ Bank
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CHAPTER 01
National Parks and Bird Sanctuaries

1. Under which of the following acts is a National Park legally notified in India?
(A) Forest (Conservation) Act, 1980
(B) Wildlife (Protection) Act, 1972
(C) Indian Forest Act, 1927
(D) Environment (Protection) Act, 1986

2. What is the fundamental legal difference between a National Park and a Wildlife Sanctuary in India?
(A) A National Park allows restricted human settlement, whereas a Wildlife Sanctuary strictly prohibits it.
(B) Wildlife Sanctuaries are declared by the Central Government, whereas National Parks are declared by the State Government.
(C) National Parks are specifically for tigers, while Wildlife Sanctuaries are for all other animals.
(D) No rights of people are allowed in a National Park, whereas certain rights may be allowed in a Wildlife Sanctuary.

3. What is the primary ecological purpose behind establishing a Bird Sanctuary?
(A) To conserve avian habitats and protect native and migratory birds from hunting and habitat loss
(B) To promote commercial breeding of exotic bird species
(C) To create a captive environment for collecting feathers and bird products
(D) To isolate bird species from terrestrial wildlife to prevent disease transmission

4. Consider the following statements regarding the features of protected areas:
I. Grazing of livestock is strictly prohibited inside a National Park.
II. A Wildlife Sanctuary can be upgraded to a National Park.
III. The boundaries of a Wildlife Sanctuary are fixed by legislation and cannot be altered without a resolution passed by the state legislature.
Which of the above statements is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II and III

5. Given below are two statements, one labeled as Assertion (A) and the other as Reason (R).
Assertion (A): The alteration of boundaries of a National Park requires the recommendation of the National Board for Wildlife (NBWL).
Reason (R): The Wildlife (Protection) Act, 1972 strictly safeguards National Parks from arbitrary territorial reduction by state authorities.
Which of the following is correct?
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

6. What defines a 'Conservation Reserve' under the Wildlife (Protection) Act, 1972?
(A) Privately owned community land designated under central authority strictly for regional wildlife preservation.
(B) A heavily guarded core zone within a Tiger Reserve where human entry and management are prohibited.
(C) An internationally recognized wetland site set aside for the conservation of migratory bird species.
(D) State-declared areas adjacent to protected zones for landscape and habitat conservation.

7. According to the Wildlife (Protection) Act, 1972, the Chief Wildlife Warden may grant permits to enter or reside in a sanctuary for which of the following purposes?
(A) Commercial logging and timber extraction
(B) Scientific research and photography
(C) Establishing temporary agricultural fields
(D) Large-scale mining of minor minerals

8. Which international convention governs the recognition of wetlands of international

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importance, many of which act as major bird sanctuaries in India?
(A) Convention on Biological Diversity (CBD)
(B) Bonn Convention
(C) Ramsar Convention
(D) CITES

9. Match List I with List II and select the correct answer using the codes given below:
List I: Protected Area Category
P. National Park
Q. Wildlife Sanctuary
R. Conservation Reserve
S. Community Reserve
List II: Key Characteristic
1. Community-owned land declared for wildlife protection
2. State-owned land adjacent to a protected area acting as a buffer
3. Complete prohibition of all human interference and grazing
4. Certain restricted grazing and community rights may be allowed
(A) P-3, Q-4, R-2, S-1
(B) P-4, Q-3, R-1, S-2
(C) P-3, Q-4, R-1, S-2
(D) P-2, Q-1, R-4, S-3

10. Which was the first National Park established in India?
(A) Hailey National Park
(B) Kaziranga National Park
(C) Kanha National Park
(D) Gir National Park

11. As per recent data, the total area covered by National Parks in India is approximately what percentage of the country's total geographic area?
(A) Around 1.35%
(B) Around 4.50%
(C) Around 6.25%
(D) Around 10.00%

12. Which state/union territory in India has the highest number of National Parks?
(A) Uttar Pradesh
(B) Madhya Pradesh
(C) Maharashtra
(D) Assam

13. Which of the following is the largest National Park in India by area?
(A) Hemis National Park
(B) Desert National Park
(C) Gangotri National Park
(D) Namdapha National Park

14. Consider the following statements regarding the status of National Parks in India:
I. India has more than 100 officially notified National Parks.
II. Marine National Park in the Gulf of Kutch is India's first marine protected area.
III. Hemis National Park is famous for the conservation of the Asiatic Lion.
IV. South Button Island National Park is the smallest National Park in India.
Which of the above statements is/are correct?
(A) I, II and III
(B) I, II and IV
(C) II, III and IV
(D) I, III and IV

15. In which district(s) of Uttar Pradesh is the Dudhwa National Park primarily located?
(A) Pilibhit and Bareilly
(B) Bahraich and Shravasti
(C) Sonbhadra and Mirzapur
(D) Lakhimpur Kheri

16. In which year was Dudhwa officially upgraded from a wildlife sanctuary to a National Park?
(A) 1958
(B) 1968
(C) 1977
(D) 1988

17. Dudhwa National Park is globally renowned for the successful conservation and reintroduction of which of the following species?
(A) Great Indian Bustard
(B) Indian Rhinoceros
(C) Snow Leopard
(D) Asiatic Lion

18. Which major river forms the international boundary along the northern edge of Dudhwa National Park, separating it from Nepal?
(A) Gomti
(B) Ghaghara
(C) Rapti
(D) Mohana

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19. When was the Pilibhit Tiger Reserve officially notified by the Government of Uttar Pradesh?
(A) 2008
(B) 2014
(C) 2018

(D) 2021

20. Pilibhit Tiger Reserve received the prestigious TX2 award. What does the TX2 award signify?
(A) Maintaining zero recorded human-wildlife conflict incidents over a continuous two-year period
(B) Establishing two functional ecological corridors connecting major isolated tiger habitats
(C) Doubling wild tiger populations within a set timeframe
(D) Achieving verifiable net-zero carbon emissions in field reserve management operations

21. Apart from Pilibhit, the forests of Pilibhit Tiger Reserve also extend into which neighbouring district of Uttar Pradesh?
(A) Shahjahanpur
(B) Moradabad
(C) Sitapur
(D) Bijnor

22. Which river flows directly through the heart of the Jim Corbett National Park?
(A) Alaknanda
(B) Bhagirathi
(C) Yamuna
(D) Ramganga

23. Kaziranga National Park is famously recognized as the primary habitat for which endangered species?
(A) Asiatic Elephant
(B) One-horned Rhinoceros
(C) Royal Bengal Tiger
(D) Lion-tailed Macaque

24. Given below are two statements, one labeled as Assertion (A) and the other as Reason (R).
Assertion (A): Gir National Park in Gujarat is the only natural habitat of the Asiatic Lion in the world.
Reason (R): Asiatic lions were successfully translocated to Dudhwa National Park to create a secondary wild population.
Which of the following is correct?
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

25. Bandipur National Park, a significant tiger reserve and part of the Nilgiri Biosphere Reserve, is located in which state?
(A) Kerala
(B) Tamil Nadu
(C) Andhra Pradesh
(D) Karnataka

26. Keoladeo Ghana National Park, one of the most famous bird sanctuaries in India, was formerly known by what name?
(A) Bharatpur Bird Sanctuary
(B) Salim Ali Bird Sanctuary
(C) Sultanpur Bird Sanctuary
(D) Nal Sarovar Bird Sanctuary

27. What is the primary source of water that sustains the wetlands of Keoladeo Ghana National Park?
(A) Direct incoming backwaters flowing inland from the coastal regions of the Arabian Sea
(B) Monsoon runoff and controlled releases from Ajan Dam
(C) Continuous natural perennial flow originating directly from the nearby Yamuna River
(D) Seasonal glacial melt flowing down from the streams of the lower Himalayan ranges

28. Chilika Lake is a crucial wintering ground for migratory birds. Which type of water body is Chilika Lake?
(A) High-altitude glacial lake
(B) Brackish water lagoon
(C) Freshwater oxbow lake
(D) Artificial reservoir

29. Select the correct order of the following National Parks from North to South geographically:
(A) Dachigam, Corbett, Bandhavgarh, Bandipur
(B) Corbett, Dachigam, Bandipur, Bandhavgarh
(C) Dachigam, Bandhavgarh, Corbett, Bandipur
(D) Corbett, Bandhavgarh, Dachigam, Bandipur

30. The Shaheed Chandra Shekhar Azad Bird Sanctuary, formerly known as Nawabganj Bird Sanctuary, is situated in which district of Uttar Pradesh?
(A) Kanpur
(B) Lucknow
(C) Unnao
(D) Hardoi

31. In which year was the Nawabganj Bird Sanctuary renamed to Shaheed Chandra Shekhar Azad Bird Sanctuary?
(A) 2005

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(B) 2011
(C) 2015
(D) 2019

32. Samaspur Bird Sanctuary, a significant habitat for resident and migratory birds, is located in which district of Uttar Pradesh?
(A) Gonda
(B) Mainpuri
(C) Raebareli
(D) Etawah

33. Parvati Arga Bird Sanctuary, designated as a Ramsar site, is situated in which district of Uttar Pradesh?
(A) Ballia
(B) Gonda
(C) Sant Kabir Nagar
(D) Maharajganj

34. Consider the following statements regarding Bird Sanctuaries in Uttar Pradesh:
I. Bakhira Bird Sanctuary is the largest natural floodplain wetland in eastern Uttar Pradesh.
II. Sur Sarovar Bird Sanctuary is also known as Keetham Lake.
III. Sandi Bird Sanctuary is located in the Aligarh district.
Which of the above statements is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II and III

35. Sur Sarovar Bird Sanctuary, which hosts a large population of migratory birds and a bear rescue centre, is located near which city?
(A) Agra
(B) Mathura
(C) Varanasi
(D) Kanpur

36. Okhla Bird Sanctuary is located at the point where the Yamuna River leaves the territory of Delhi and enters which district of Uttar Pradesh?
(A) Ghaziabad
(B) Meerut
(C) Gautam Buddha Nagar
(D) Baghpat

37. Which bird sanctuary in Uttar Pradesh was created to protect the local avifauna near the Garra River and is located in the Hardoi district?
(A) Sandi Bird Sanctuary
(B) Saman Bird Sanctuary
(C) Patna Bird Sanctuary
(D) Lakh Bahoshi Bird Sanctuary

38. Lakh Bahoshi Bird Sanctuary, one of India's larger bird sanctuaries spanning over two distinct lakes, is located in:
(A) Farrukhabad
(B) Etawah
(C) Mainpuri
(D) Kannauj

39. Patna Bird Sanctuary, despite its name, is situated in Uttar Pradesh. It is the smallest bird sanctuary in the state and is located in the district of:
(A) Aligarh
(B) Etah
(C) Hathras
(D) Kasganj

40. Match List I with List II and select the correct answer using the codes given below:
List I: Bird Sanctuary
P. Saman Bird Sanctuary
Q. Bakhira Bird Sanctuary
R. Surha Taal Bird Sanctuary
S. Vijai Sagar Bird Sanctuary
List II: District in UP
1. Ballia
2. Mahoba
3. Mainpuri
4. Sant Kabir Nagar
(A) P-3, Q-4, R-1, S-2
(B) P-4, Q-3, R-2, S-1
(C) P-3, Q-1, R-4, S-2
(D) P-1, Q-4, R-3, S-2

41. Most of the migratory birds arriving in northern India, including Uttar Pradesh, travel via which prominent migration route?
(A) East Asian-Australasian Flyway
(B) Pacific Americas Flyway
(C) Atlantic Flyway
(D) Central Asian Flyway

42. During which period do the majority of long-distance migratory birds from Siberia and Central Asia arrive in the wetlands of Uttar Pradesh?
(A) March to May
(B) June to August
(C) October to November
(D) January to February only

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43. Which globally threatened migratory bird was historically famous for wintering at Keoladeo National Park but has largely stopped arriving in recent decades?
(A) Greater Flamingo
(B) Siberian Crane
(C) Bar-headed Goose
(D) Demoiselle Crane

44. In which year was the Ramsar Convention on Wetlands of International Importance adopted?
(A) 1971
(B) 1972
(C) 1980
(D) 1986

45. As of recent updates, how many wetlands in Uttar Pradesh are designated as Ramsar Sites?
(A) 6
(B) 8
(C) 10
(D) 12

46. Given below are two statements, one labeled as Assertion (A) and the other as Reason (R).
Assertion (A): Shallow wetlands in Uttar Pradesh dry up significantly during the summer months but act as crucial wintering grounds for migratory waterfowl.
Reason (R): The dynamic wetting and drying cycle of these wetlands facilitates a massive growth of aquatic flora and macro-invertebrates during the post-monsoon season, offering abundant food.
Which of the following is correct?
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

47. Haiderpur Wetland, one of the recognised Ramsar sites in Uttar Pradesh, is located near the borders of which districts?
(A) Meerut and Hapur
(B) Saharanpur and Shamli
(C) Bulandshahr and Aligarh
(D) Muzaffarnagar and Bijnor

48. Which wetland was added to the Ramsar list from Uttar Pradesh, located in the Sant Kabir Nagar district and serving as a safe wintering ground for Palearctic birds?
(A) Sur Sarovar
(B) Sarsai Nawar Jheel
(C) Bakhira Sanctuary
(D) Samaspur Bird Sanctuary

49. The Upper Ganga River stretches from Brijghat to Narora and is recognized as a Ramsar site. Which rare aquatic mammal is conserved in this stretch?
(A) Irrawaddy Dolphin
(B) Ganges Dolphin
(C) Dugong
(D) Finless Porpoise

50. Sarsai Nawar Jheel, a Ramsar site notable for its population of Sarus Cranes, is located in which district?
(A) Kanpur Dehat
(B) Auraiya
(C) Fatehpur
(D) Etawah

51. In which year was Sur Sarovar (Keetham Lake) in Agra designated as a Ramsar Site?
(A) 2014
(B) 2017
(C) 2020
(D) 2022

52. Which of the following best describes the ecological relationship between wetlands and local avifauna?
(A) Wetlands provide isolated breeding grounds exclusively for terrestrial forest birds during seasonal migrations.
(B) Wetlands accelerate the regional desertification process, thereby forcing resident birds to migrate much faster.
(C) Wetlands provide breeding and feeding grounds through rich aquatic food webs.
(D) Wetlands naturally emit toxic marsh gases that suppress populations of invasive avian species.

53. Consider the following pairs of Ramsar sites in Uttar Pradesh and their key characteristics:
I. Nawabganj Bird Sanctuary - Known for its deer park and migratory ducks.
II. Parvati Arga Bird Sanctuary - Comprises two oxbow lakes.
III. Samaspur Bird Sanctuary - Comprises six interconnected lakes.
IV. Sandi Bird Sanctuary - Created mainly by the flooding of the Gomti river.

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Which of the above pairs is/are correct?
(A) I, II and III
(B) I, II and IV
(C) II, III and IV
(D) I, III and IV

54. The establishment of National Parks is an example of which type of biodiversity conservation?
(A) Ex-situ zoo conservation
(B) Cryopreservation
(C) Captive breeding
(D) In-situ conservation

55. Which apex authority provides the comprehensive guidelines for Ecotourism in tiger reserves and protected areas in India?
(A) Zoological Survey of India (ZSI)
(B) National Tiger Conservation Authority
(C) Forest Survey of India (FSI)
(D) Indian Institute of Forest Management (IIFM)

56. In the context of ecotourism in National Parks, what does "Carrying Capacity" refer to?
(A) The maximum allowable gross vehicle weight for safari trucks operating in buffer zones.
(B) The highest population density of wild herbivores that a forest reserve can support indefinitely.
(C) Maximum tourist load a park can sustain without ecological harm.
(D) The total annual volume of commercial timber allowed to be legally harvested by communities.

57. In the administration of protected areas, what is the core document prepared to outline conservation objectives, zoning, and administrative duties for a 10-year period?
(A) Working Plan
(B) Eco-Development Plan
(C) Biodiversity Action Plan
(D) Management Plan

58. Under the Wildlife (Protection) Act, 1972, who is primarily responsible for the immediate field-level protection, controlling poaching, and daily management of a National Park or Sanctuary?
(A) Wildlife Warden / Range Forest Officer
(B) Principal Chief Conservator of Forests
(C) District Magistrate
(D) State Board for Wildlife

59. Select the correct sequential order of the fundamental steps involved in preparing a Management Plan for a Protected Area:
I. Zonation of the protected area
II. Review of past management and ecological baseline survey
III. Setting long-term and short-term conservation objectives
IV. Drafting the plan and securing approval from the Chief Wildlife Warden
(A) II, III, I, IV
(B) I, II, III, IV
(C) II, I, III, IV
(D) III, II, I, IV

60. What is the fundamental restriction applied to the "Core Zone" of a National Park or Tiger Reserve?
(A) It is fully designated and opened for intensive ecotourism activities and commercial safari lodge development.
(B) Strictly conserved as an inviolate area dedicated to wildlife habitat.
(C) Local registered indigenous communities are permitted to gather non-timber forest produce for subsistence.
(D) It is exclusively demarcated for setting up eco-development projects and community resource centers.

61. Following the Wildlife (Protection) Amendment Act, 2022, the schedules of the Act have been rationalized. How many schedules does the amended Act currently contain?
(A) 4
(B) 5
(C) 6
(D) 8

62. Species listed in Schedule I of the Wildlife (Protection) Act, 1972 (as amended) receive:
(A) Moderate statutory protection, allowing regulated trophy hunting under special administrative permits.
(B) Legal protection restricted exclusively within notified boundaries of national parks and sanctuaries.
(C) Highest legal protection with maximum statutory penalties.
(D) Complete exclusion from legal protection, classifying the species as vermin across all regions.

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63. The concept of declaring certain wild animals as 'vermin' (allowing them to be hunted for a specified period) falls under the purview of which authority according to the Wildlife (Protection) Act, 1972?
(A) The State Forest Minister
(B) The District Magistrate
(C) The Gram Sabha
(D) The Central Government

64. Match List I with List II and select the correct answer using the codes given below:
List I: Concept/Term under WPA
P. Chief Wildlife Warden
Q. State Board for Wildlife
R. National Board for Wildlife
S. Eco-Sensitive Zone
List II: Description
1. Chaired by the Prime Minister
2. Buffer area outside protected areas to act as a shock absorber
3. Statutory authority at the state level controlling wildlife management
4. Advisory body at the state level chaired by the Chief Minister
(A) P-3, Q-4, R-1, S-2
(B) P-4, Q-3, R-2, S-1
(C) P-3, Q-1, R-4, S-2
(D) P-1, Q-2, R-3, S-4

65. The concept of "Biosphere Reserve" was initiated internationally under which programme of UNESCO?
(A) World Heritage Programme
(B) Man and the Biosphere (MAB) Programme
(C) Global Environment Facility (GEF)
(D) United Nations Environment Programme (UNEP)

66. Structurally, a Biosphere Reserve is divided into three distinct zones. Which zone completely prohibits human settlement and resource extraction?
(A) Buffer Zone
(B) Transition Zone
(C) Manipulation Zone
(D) Core Zone

67. Which of the following was the first Biosphere Reserve established in India?
(A) Nilgiri Biosphere Reserve
(B) Nanda Devi Biosphere Reserve
(C) Gulf of Mannar Biosphere Reserve
(D) Sundarbans Biosphere Reserve

68. How does the legal status of human settlements differ between a National Park and a Biosphere Reserve?
(A) Neither category permits any permanent human settlements or resource collection within their entire boundaries.
(B) National Parks grant rights to tribal settlements, whereas Biosphere Reserves enforce total exclusion everywhere.
(C) National Parks prohibit human settlement, while Biosphere Reserves permit it in outer zones.
(D) Both legal designations permit unrestricted human settlements subject to routine state administrative approval.

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69. Under the Forest Rights Act (FRA), 2006, what term is used for areas inside National Parks and Sanctuaries that are required to be kept as inviolate for wildlife conservation, where forest rights may be modified or resettled?
(A) Critical Wildlife Habitats
(B) Eco-Sensitive Zones
(C) High Conservation Value Forests
(D) Biosphere Core Areas

70. Consider the following statements regarding the differences between Biosphere Reserves and National Parks:
I. A single Biosphere Reserve can encompass multiple National Parks and Wildlife Sanctuaries within its boundaries.
II. National Parks are created under the Environment (Protection) Act, 1986, while Biosphere Reserves are created under the Wildlife (Protection) Act, 1972.
III. The primary focus of a National Park is species and habitat protection, while a Biosphere Reserve focuses on sustainable development balancing conservation and human use.
Which of the above statements is/are correct?
(A) I and II only
(B) I and III only
(C) II and III only
(D) I, II and III

71. Who is the administrative head of the Forest and Wildlife Department in the state of Uttar Pradesh?
(A) Minister of Environment, Forest and Climate Change of the State
(B) Principal Chief Conservator of Forests
(C) Additional Chief Secretary (Forests)

(D) Chief Wildlife Warden

72. In the hierarchical structure of the Uttar Pradesh Forest Department, a Forest Circle is usually headed by an officer of which rank?
(A) Divisional Forest Officer operating at district level
(B) Sub-Divisional Forest Officer (SDFO)
(C) Conservator of Forests
(D) Range Forest Officer (RFO)

73. Which of the following officers is the statutory authority authorized to grant permission for hunting a Schedule I wild animal if it becomes dangerous to human life?
(A) Divisional Forest Officer
(B) District Magistrate
(C) Inspector General of Forests
(D) Chief Wildlife Warden

74. What is the primary objective of establishing Eco-Development Committees (EDCs) around protected areas?
(A) To provide alternative livelihoods and reduce forest dependence.
(B) To issue specialized arms licenses directly to local villagers for personal self-defense against wildlife.
(C) To legally hand over total administrative ownership of the National Park to local panchayats.
(D) To train local resident communities in scientific techniques for commercial timber harvesting operations.

75. Joint Forest Management (JFM) is a concept that works closely with EDC principles. In which decade did the Government of India officially release guidelines for JFM?
(A) 1970s
(B) 1990s
(C) 2000s
(D) 2010s

76. Given below are two statements, one labeled as Assertion (A) and the other as Reason (R).
Assertion (A): Eco-Development Committees (EDCs) are crucial for mitigating human-wildlife conflict near tiger reserves.
Reason (R): By integrating local communities into conservation efforts and sharing ecotourism revenue, EDCs foster a sense of ownership and reduce retaliatory killings of wildlife.
Which of the following is correct?
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

77. Which series of Indian satellites is extensively utilized by the Forest Survey of India (FSI) for mapping forest cover and monitoring protected areas?
(A) RESOURCESAT
(B) INSAT
(C) GSAT
(D) ASTROSAT

78. Remote sensing techniques use vegetation indices to assess the health of flora in a National Park. Which of the following is the most commonly used index for this purpose?
(A) Air Quality Index (AQI)
(B) Palmer Drought Severity Index
(C) Normalized Difference Vegetation Index
(D) Shannon-Wiener Index

79. What is the name of the software-based monitoring system launched by NTCA for patrolling and ecological assessment in tiger reserves?
(A) e-Gaj
(B) Vana-Mitra
(C) Bagh-Rakshak
(D) M-STrIPES

80. Consider the following statements regarding the use of technology in managing protected areas:
I. M-STrIPES uses GPS logs to track the intensity and spatial coverage of foot patrols by forest guards.
II. Drone technology is legally banned for use in anti-poaching operations in India.
III. Camera traps are equipped with infrared sensors to capture images of nocturnal wildlife without disturbing them.
IV. Satellite imagery helps in identifying changes in water body spread during summer months.
Which of the above statements is/are correct?
(A) I, II and III
(B) I, III and IV
(C) II, III and IV
(D) I, II and IV

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81. According to the "Status of Tigers in India-2022" report, what was the estimated population of wild tigers in Uttar Pradesh?
(A) 117
(B) 173
(C) 205
(D) 296

82. In which decade was the successful Rhino Reintroduction Programme initiated in Dudhwa National Park?
(A) 1960s
(B) 1970s
(C) 1980s
(D) 2000s

83. Which of the following National Parks in India is NOT designated as a UNESCO World Heritage Site?
(A) Bandipur National Park
(B) Kaziranga National Park
(C) Keoladeo National Park
(D) Great Himalayan National Park

84. Keoladeo National Park was once placed on the "Montreux Record" under the Ramsar Convention. What does inclusion in the Montreux Record signify?
(A) The wetland is verified to be operating at its peak potential ecological and biological efficiency.
(B) The wetland is officially documented as hosting the highest density of migratory birds globally.
(C) Ecological character has changed or is threatened by human impact.
(D) The wetland has undergone complete restoration and is permanently removed from all monitoring lists.

85. Select the correct chronological order of the establishment of the following Tiger Reserves in Uttar Pradesh (Earliest to Latest):
(A) Dudhwa, Amangarh, Pilibhit, Ranipur
(B) Dudhwa, Pilibhit, Amangarh, Ranipur
(C) Pilibhit, Dudhwa, Ranipur, Amangarh
(D) Amangarh, Dudhwa, Pilibhit, Ranipur

86. The Asian Waterbird Census (AWC), an integral part of the global waterbird monitoring programme, is typically conducted in India during which month?
(A) April
(B) July
(C) October
(D) January

87. Which scientific census method involves walking a predetermined path at a constant speed while recording all animal or bird sightings and their perpendicular distance from the path?
(A) Point Count Method
(B) Line Transect Method
(C) Capture-Recapture Method
(D) Call Playback Method

88. For dense forest canopies where visual detection of birds is difficult, which method is predominantly used by ornithologists to estimate bird populations?
(A) High-resolution aerial drone surveys
(B) Satellite imagery
(C) Acoustic point counts
(D) Pugmark tracking

89. Match List I with List II and select the correct answer using the codes given below:

List I: Census Technique
P. Camera Trapping
Q. Point Count
R. Dung Decay / Pellet Count
S. Mist Netting

List II: Target Organism/Application
1. Forest birds and small flying species
2. Estimating herbivore densities (e.g., deer)
3. Individual identification of large carnivores (e.g., tigers)
4. Songbirds in a fixed radius over a specific time

(A) P-3, Q-4, R-2, S-1
(B) P-4, Q-3, R-1, S-2
(C) P-3, Q-1, R-4, S-2
(D) P-2, Q-4, R-3, S-1

90. eBird is a widely used portal in India and globally. What is its primary function?
(A) A citizen-science portal for recording bird observations.
(B) An e-commerce platform dedicated to selling specialized avian feeds and care equipment.
(C) A statutory government portal for issuing controlled game hunting licenses to tourists.
(D) A real-time satellite tracking and monitoring system for tagged wild tiger individuals.

91. Who has the authority to upgrade a legally notified Wildlife Sanctuary into a National Park?
(A) The District Magistrate

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(B) The State Government
(C) The Gram Panchayat
(D) The State Tourism Board

92. No alteration of the boundaries of a National Park shall be made except on a recommendation of the:
(A) National Tiger Conservation Authority
(B) National Board for Wildlife
(C) Ministry of Environment, Forest and Climate Change
(D) State Legislature

93. The National Board for Wildlife (NBWL) is the apex advisory body in the field of wildlife conservation in India. Who serves as its ex-officio Chairperson?
(A) Prime Minister of India
(B) Minister of Environment, Forest and Climate Change
(C) President of India
(D) Director General of Forests

94. The State Board for Wildlife (SBWL) is constituted to advise the state government in selection and management of protected areas. Who chairs the SBWL?
(A) State Forest Minister
(B) Chief Wildlife Warden
(C) Chief Minister
(D) Governor

95. Consider the following statements about the statutory boards under the Wildlife (Protection) Act, 1972:
I. The NBWL is a statutory organization constituted under the Environment (Protection) Act, 1986.
II. The NBWL serves as the apex body to review all wildlife-related matters and approve projects in and around national parks and sanctuaries.
III. The SBWL meets at least twice a year to advise the state government on wildlife protection.
Which of the above statements is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II and III

96. What is the fundamental difference between a Conservation Reserve and a Community Reserve under the Indian wildlife framework?
(A) Conservation Reserves are managed exclusively by non-governmental entities, while Community Reserves are central.
(B) Conservation Reserves permit regulated sports hunting, whereas Community Reserves ban all activities.
(C) Conservation Reserves are on public land; Community Reserves are on private/ community land.
(D) Community Reserves are statutory protected categories created exclusively for marine and coastal ecosystems.

97. Hemis National Park, renowned globally for the highest density of snow leopards in any protected area, is located in:
(A) Himachal Pradesh
(B) Ladakh
(C) Uttarakhand
(D) Sikkim

98. South Button Island National Park, covering an area of just about 5 square kilometers and known for its shallow water coral reefs, is located in:
(A) Lakshadweep
(B) Gulf of Mannar
(C) Sundarbans Delta
(D) Andaman and Nicobar Islands

99. Where is India's first Marine National Park located?
(A) Gulf of Kutch
(B) Gulf of Mannar
(C) Palk Strait
(D) Chilika Lake

100. Keibul Lamjao National Park is the only floating National Park in the world. It is located on which lake?
(A) Wular Lake
(B) Vembanad Lake
(C) Loktak Lake
(D) Pulicat Lake

101. Dudhwa Tiger Reserve consists of Dudhwa National Park and which two wildlife sanctuaries?
(A) Kishanpur and Katarniaghat
(B) Suhelwa and Sohagi Barwa
(C) Kaimoor and Chandraprabha
(D) Bakhira and Saman

102. Katarniaghat Wildlife Sanctuary, a critical part of the Terai landscape connecting tiger habitats of Dudhwa and Nepal, is located in which district?

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(A) Pilibhit
(B) Gonda
(C) Maharajganj
(D) Bahraich

103. The physical geography and vegetation of Dudhwa National Park predominantly belong to which distinct landscape?
(A) Semi-arid thorn scrub and dry deciduous forests
(B) Terai wet grasslands and sal forests
(C) Alpine meadows and broadleaf temperate forests
(D) Mangrove swamps and tidal forests

104. Given below are two statements, one labeled as Assertion (A) and the other as Reason (R).
Assertion (A): The Terai landscape of Dudhwa and Pilibhit is highly suitable for the survival of the Swamp Deer (Barasingha).
Reason (R): Swamp deer rely extensively on tall, marshy grasslands and waterlogged depressions for food and camouflage against predators.
Which of the following is correct?
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

105. Which river marks the north-eastern boundary of the Pilibhit Tiger Reserve and is famous for the Chuka eco-tourism beach?
(A) Ganga
(B) Yamuna
(C) Betwa
(D) Sharda

106. Which is the smallest wildlife sanctuary in Uttar Pradesh, located in the Lalitpur district?
(A) Mahavir Swami Wildlife Sanctuary
(B) Chandraprabha Wildlife Sanctuary
(C) Ranipur Wildlife Sanctuary
(D) Turtle Wildlife Sanctuary

107. By geographical area, which is the largest wildlife sanctuary in Uttar Pradesh, spanning across districts like Meerut, Bijnor, Hapur, and Amroha?
(A) Kaimoor Wildlife Sanctuary
(B) Hastinapur Wildlife Sanctuary
(C) National Chambal Sanctuary
(D) Suhelwa Wildlife Sanctuary

108. Kaimoor Wildlife Sanctuary, known for blackbucks and scenic waterfalls, is spread across which two districts of Uttar Pradesh?
(A) Agra and Etawah
(B) Mirzapur and Sonbhadra
(C) Banda and Chitrakoot
(D) Jhansi and Lalitpur

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109. Ranipur Tiger Reserve, declared as the 4th Tiger Reserve of Uttar Pradesh, is located in which district?
(A) Chitrakoot
(B) Lalitpur
(C) Mahoba
(D) Hamirpur

110. Match List I with List II and select the correct answer using the codes given below:
List I: Tiger Reserve in UP
P. Dudhwa Tiger Reserve
Q. Pilibhit Tiger Reserve
R. Amangarh Tiger Reserve
S. Ranipur Tiger Reserve
List II: Key Geographical Feature / Location
1. Buffer to Corbett National Park, located in Bijnor
2. Located in the Bundelkhand region
3. Contains the Mohana and Suheli rivers
4. Bounded by the Sharda river, known for Chuka beach
(A) P-3, Q-4, R-1, S-2
(B) P-4, Q-3, R-2, S-1
(C) P-3, Q-1, R-4, S-2
(D) P-1, Q-2, R-3, S-4

111. Amangarh Tiger Reserve acts as a crucial buffer and corridor for tigers moving from which famous National Park?
(A) Rajaji National Park
(B) Valmiki National Park
(C) Dudhwa National Park
(D) Corbett National Park

112. Jim Corbett National Park, when initially established in 1936, was named Hailey National Park. It was briefly renamed in the 1950s before getting its current name. What was that brief name?
(A) Shivalik National Park
(B) Nanda Devi National Park
(C) Ramganga National Park
(D) Himalayan National Park

113. Bandhavgarh National Park, renowned for having one of the highest densities of Bengal tigers in the world, is located in:
(A) Rajasthan
(B) Madhya Pradesh
(C) Chhattisgarh
(D) Jharkhand

114. Consider the following pairs of National Parks and their flagship species:
I. Gir National Park - Asiatic Lion
II. Kaziranga National Park - One-horned Rhinoceros
III. Dachigam National Park - Hangul (Kashmir Stag)
IV. Keibul Lamjao National Park - Sangai (Brow-antlered deer)
Which of the above pairs is/are correctly matched?
(A) I and II only
(B) I, II and III only
(C) II, III and IV only
(D) I, II, III and IV

115. Salim Ali Bird Sanctuary, named after the eminent Indian ornithologist, is an estuarine mangrove habitat located in:
(A) Goa
(B) Maharashtra
(C) Kerala
(D) Gujarat

116. Ranganathittu Bird Sanctuary, the largest bird sanctuary in its state, comprising six islets on the banks of the Kaveri river, is located in:
(A) Tamil Nadu
(B) Andhra Pradesh
(C) Karnataka
(D) Telangana

117. Which is considered the oldest water bird sanctuary in India, located in Tamil Nadu?
(A) Vedanthangal Bird Sanctuary
(B) Point Calimere Bird Sanctuary
(C) Pulicat Lake Bird Sanctuary
(D) Nelapattu Bird Sanctuary

118. Nalsarovar Bird Sanctuary, known for being the largest wetland bird sanctuary in its region and hosting massive flocks of flamingos, is situated in:
(A) Rajasthan
(B) Madhya Pradesh
(C) Maharashtra
(D) Gujarat

119. Sur Sarovar Bird Sanctuary in Agra is a vital wintering area for migratory waterfowl. Which of the following is NOT typically a migratory bird found here during winters?
(A) Northern Pintail Duck
(B) Great Indian Bustard
(C) Greylag Goose
(D) Bar-headed Goose

120. Saman Bird Sanctuary, an oxbow lake in the Mainpuri district, is especially noted for conserving a large population of which resident bird species?
(A) Indian Peafowl
(B) Malabar Hornbill
(C) Sarus Crane
(D) Himalayan Monal

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121. The Surajpur Wetland and Bird Sanctuary, a significant urban wetland for conservation of biodiversity in the National Capital Region, is located in:
(A) Ghaziabad
(B) Faridabad
(C) Gurugram
(D) Gautam Buddha Nagar

122. Which remarkable migratory bird is known to fly over the high Himalayas to reach Indian wetlands for wintering?
(A) Bar-headed Goose
(B) Arctic Tern
(C) Amur Falcon
(D) Pied Cuckoo

123. The Amur Falcon undertakes one of the longest marine migrations of any bird. Which lake region in India is globally famous as its mass roosting site during autumn passage?
(A) Chilika Lake, Odisha
(B) Doyang Reservoir
(C) Loktak Lake, Manipur
(D) Umiam Lake, Meghalaya

124. Under the criteria for identifying Wetlands of International Importance (Ramsar Sites), a wetland should be considered internationally important if it regularly supports what percentage of the individuals in a population of one species or subspecies of waterbird?
(A) 0.1%
(B) 1%
(C) 5%

(D) 10%

125. In which year were six prominent bird sanctuaries of Uttar Pradesh (including Nawabganj, Sandi, and Samaspur) collectively declared as Ramsar sites?
(A) 2010
(B) 2015
(C) 2019
(D) 2022

126. Which of the following Ramsar sites in Uttar Pradesh is historically a tectonic lake rather than an oxbow lake formed by a river?
(A) Sandi Bird Sanctuary
(B) Sur Sarovar
(C) Bakhira Sanctuary
(D) Parvati Arga

127. Bakhira Wildlife Sanctuary provides a secure wintering habitat to waterbirds from which major zoogeographic realm?
(A) Neotropical Realm
(B) Australasian Realm
(C) Nearctic Realm
(D) Palearctic Realm

128. Arrange the following Ramsar Sites of Uttar Pradesh roughly in order from West to East based on their geographical location:
I. Upper Ganga River (Brijghat to Narora)
II. Sur Sarovar (Agra)
III. Nawabganj Bird Sanctuary (Unnao)
IV. Parvati Arga Bird Sanctuary (Gonda)
(A) I, II, III, IV
(B) II, I, III, IV
(C) I, III, II, IV
(D) II, III, I, IV

129. What essential ecosystem service do wetlands like Ramsar sites provide to nearby human settlements in Uttar Pradesh?
(A) High-grade timber production
(B) Groundwater recharge
(C) Generation of geothermal energy
(D) Primary source of metallic minerals

130. Eutrophication is a major threat to bird sanctuaries like Keetham and Nawabganj. What is the primary cause of eutrophication in these wetlands?
(A) Unregulated commercial fish hunting and trawling operations
(B) Accelerated water evaporation during extreme summer heatwaves
(C) Unchecked growth and expansion of submerged coral reef structures
(D) Agricultural runoff containing nitrogen and phosphorus

131. Which highly invasive aquatic plant chokes several wetlands and bird sanctuaries in Uttar Pradesh, depleting dissolved oxygen and restricting bird movement?
(A) Water Hyacinth
(B) Lotus (Nelumbo nucifera)
(C) Hydrilla
(D) Duckweed

132. Project Tiger, India's most renowned wildlife conservation programme, was launched in which year?
(A) 1970
(B) 1972
(C) 1973
(D) 1980

133. The Wildlife (Protection) Act, the umbrella legislation for creating National Parks and Sanctuaries in India, was enacted in the year:
(A) 1927
(B) 1972
(C) 1980
(D) 1986

134. Consider the following statements about rights of citizens inside protected areas:
I. Inside a National Park, rights to forest produce and grazing are completely extinguished.
II. Inside a Wildlife Sanctuary, the Chief Wildlife Warden may allow certain rights to continue for local communities if they do not harm wildlife.
III. Inside a Conservation Reserve, the land must be completely vacated by the local population.
Which of the above statements is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II and III

135. Eco-Sensitive Zones (ESZs) are notified around National Parks and Wildlife Sanctuaries under the provisions of which Act?
(A) Indian Forest Act, 1927
(B) Environment (Protection) Act, 1986
(C) Wildlife (Protection) Act, 1972

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(D) Biological Diversity Act, 2002

136. In the absence of a specific notification defining the boundary, what is the default radius of the Eco-Sensitive Zone around a National Park or Sanctuary as per Supreme Court directives?
(A) 1 km
(B) 5 km
(C) 10 km
(D) 25 km

137. In a standard Management Plan of a protected area, the zone demarcated specifically to accommodate regulated visitor entry and safaris is called the:
(A) Core Zone
(B) Eco-Sensitive Zone
(C) Restitution Zone
(D) Tourism Zone

138. Under the Wildlife (Protection) Act, 1972, the Chief Wildlife Warden of a state is appointed by:
(A) The State Government
(B) The Central Government
(C) The High Court
(D) The State Public Service Commission

139. Who holds the legal authority to officially notify an area as a 'Tiger Reserve'?
(A) The National Tiger Conservation Authority (NTCA) directly
(B) The State Government with NTCA approval
(C) The Central Government on its own motion
(D) The National Board for Wildlife

140. The National Tiger Conservation Authority (NTCA) is a statutory body under the Ministry of Environment, Forest and Climate Change. It was constituted through an amendment to the Wildlife (Protection) Act in which year?
(A) 1973
(B) 1992
(C) 2006
(D) 2010

141. The pastoralist community historically residing in and around the protected areas of the Shivalik and Terai regions (like Dudhwa and Rajaji) and involved in relocation discussions is the:
(A) Van Gujjar
(B) Tharu
(C) Baiga
(D) Chenchu

142. Which of the following is a structural method used to mitigate human-elephant conflict near protected boundaries?
(A) Distributing firearms to local villagers
(B) Completely deforesting the buffer zone
(C) Solar-powered electric fencing
(D) Digging shallow open wells near the boundary

143. Uttar Pradesh is one of the few states in India to declare human-wildlife conflict as a:
(A) National Emergency
(B) Non-bailable offense for the victim
(C) Epidemic
(D) State Disaster

144. Consider the following sequence of administrative ranks within the Uttar Pradesh Forest Department (from highest to lowest field executive):
I. Principal Chief Conservator of Forests (PCCF)
II. Conservator of Forests (CF)
III. Divisional Forest Officer (DFO)
IV. Range Forest Officer (RFO)
Which statement is correct regarding this hierarchy?
(A) The sequence is entirely incorrect; RFO is higher than DFO.
(B) The sequence correctly represents the administrative hierarchy from state level down to the range level.
(C) The CF is subordinate to the DFO.
(D) The PCCF is a non-executive clerical post.

145. What is the primary source of funding for the sustenance of Eco-Development Committees (EDCs) functioning near tiger reserves?
(A) Direct local property taxes collected by the administrative panchayat.
(B) Ecotourism gate receipts and government development schemes.
(C) Penalties and fines collected exclusively from convicted poachers.
(D) International developmental loans provided directly by the World Bank.

146. How are Unmanned Aerial Vehicles (UAVs/ Drones) fundamentally utilized in the management of large National Parks today?
(A) To transport heavy harvested timber directly out of core reserve zones.
(B) To aerial-drop chemical fertilizers promoting artificial forest growth.

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(C) To provide guided aerial tourist safaris over restricted core areas.
(D) For aerial surveillance, anti-poaching, and fire monitoring.

147. In modern wildlife management, the "Capture-Recapture" statistical model is most commonly paired with which field technique to estimate tiger populations?
(A) Camera trapping
(B) Pugmark tracing on glass plates
(C) Point count sampling
(D) Dung decay analysis

148. Why has the traditional 'Pugmark Census Method' been largely discarded for counting tigers in favor of camera trapping?
(A) Pugmarks are physically impossible to detect in most dense Indian forest terrains.
(B) Collecting pugmark impressions required tranquilizing animals in the field.
(C) High subjectivity and errors from overlapping tracks and soil variation.
(D) Animal pugmarks alter their structural shape every single month naturally.

149. What does the acronym BIMS stand for in the context of database management for protected areas?
(A) Biodiversity Information Management System
(B) Botanical Investigation and Monitoring Software
(C) Biological Inspection and Mapping Service
(D) Biosphere Integrated Management Solution

150. Which Indian National Park is designated as a 'Mixed' UNESCO World Heritage Site (both natural and cultural significance)?
(A) Sundarbans National Park
(B) Nanda Devi National Park
(C) Keoladeo National Park
(D) Khangchendzonga National Park

151. In which year was UNESCO's Man and the Biosphere (MAB) programme officially launched to promote sustainable development and research?
(A) 1971
(B) 1982
(C) 1992
(D) 2002

152. Nanda Devi National Park, highly acclaimed for its remote wilderness and snow leopard habitat, was inscribed as a UNESCO World Heritage site in which year?
(A) 1978
(B) 1988
(C) 1998
(D) 2008

153. Sundarbans National Park in India is renowned for its mangrove forests and Bengal Tigers. In which year did it receive UNESCO World Heritage status?
(A) 1981
(B) 1987
(C) 1993
(D) 1999

154. The standard method used by birdwatchers and ornithologists to estimate the population of congregating winter waterbirds on an open lake is:
(A) Direct visual encounter count
(B) Mist netting and ringing
(C) Camera trapping on trees
(D) Line transect through deep water

155. Which survey method is particularly effective for detecting secretive, elusive, or nocturnal bird species hidden in dense reeds or swamps?
(A) Satellite telemetry tagging
(B) Call-playback method
(C) Aerial counting
(D) Pugmark casting

156. What is the primary purpose of 'Ringing' or 'Banding' migratory birds?
(A) To legally register birds as official property of the State Forest Department.
(B) To study migration routes, lifespan, and population dynamics.
(C) To physically restrict birds from embarking on long-distance flights.
(D) To render birds easily visible and identifiable to visiting ecotourists.

157. Which premier non-governmental organization in India has been a pioneer in bird ringing and ornithological research for over a century?
(A) Bombay Natural History Society (BNHS)
(B) World Wide Fund for Nature (WWF) India
(C) Wildlife Trust of India (WTI)
(D) Centre for Science and Environment (CSE)

158. The Salim Ali Centre for Ornithology and Natural History (SACON), a premier research institute

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for bird conservation in India, is headquartered near which city?
(A) Dehradun
(B) Pune
(C) Coimbatore
(D) Bhopal

159. The Wildlife Institute of India (WII), an autonomous institution of the MoEFCC that provides training and research in wildlife management, is located in:
(A) Bengaluru
(B) New Delhi
(C) Jabalpur
(D) Dehradun

160. Which was the first wildlife sanctuary established in Uttar Pradesh (in the year 1957) to conserve the Asiatic lion initially, though the lions did not survive?
(A) Dudhwa Wildlife Sanctuary
(B) Katarniaghat Wildlife Sanctuary
(C) Chandraprabha Wildlife Sanctuary
(D) National Chambal Sanctuary

161. The historic Chandraprabha Wildlife Sanctuary is located in which district of Uttar Pradesh?
(A) Mirzapur
(B) Chandauli
(C) Sonbhadra
(D) Varanasi

162. Suhelwa Wildlife Sanctuary, known for its dense Sal and Teak forests and located along the Indo-Nepal border, is spread across which districts?
(A) Bahraich and Lakhimpur Kheri
(B) Maharajganj and Gorakhpur
(C) Pilibhit and Bareilly
(D) Shravasti, Balrampur and Gonda

163. Sohagi Barwa Wildlife Sanctuary, adjacent to the Valmiki Tiger Reserve of Bihar, is located in which district of Uttar Pradesh?
(A) Maharajganj
(B) Kushinagar
(C) Deoria
(D) Siddharthnagar

164. The Kachhua (Turtle) Wildlife Sanctuary in Uttar Pradesh, created specifically to protect freshwater turtles under the Ganga Action Plan, is situated in:
(A) Kanpur
(B) Prayagraj
(C) Varanasi
(D) Ghazipur

165. The National Chambal Sanctuary, uniquely co-administered by three states (UP, MP, Rajasthan), is primarily dedicated to the conservation of which critically endangered species?
(A) Gharial and Dolphin
(B) Royal Bengal Tiger population
(C) Indian Rhinoceros
(D) Snow Leopard

166. Vijai Sagar Bird Sanctuary, an important habitat for migratory birds in the Bundelkhand region, is located in:
(A) Jhansi
(B) Lalitpur
(C) Banda
(D) Mahoba

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167. Shekha Jheel Bird Sanctuary, recognized as an important national wetland for its diversity of aquatic birds, is located in which district?
(A) Bulandshahr
(B) Aligarh
(C) Mathura
(D) Hathras

168. Okhla Bird Sanctuary, a haven for over 300 bird species, was formed primarily due to the creation of a barrage on which river?
(A) Hindon
(B) Ganga
(C) Yamuna
(D) Gomti

169. Among the recognized bird sanctuaries in Uttar Pradesh, which one is considered the largest by area, covering parts of two large oxbow lakes?
(A) Patna Bird Sanctuary
(B) Saman Bird Sanctuary
(C) Nawabganj Bird Sanctuary
(D) Lakh Bahoshi Bird Sanctuary

170. According to official data from the Uttar Pradesh Forest Department and WII, the total area under the Protected Area network (National Parks and Sanctuaries) constitutes approximately what percentage of the total geographical area of Uttar Pradesh?
(A) About 2.4%
(B) About 6.1%
(C) About 10.8%
(D) About 15.0%

ANSWERS

1. (B) Wildlife (Protection) Act, 1972
National Parks in India are declared and governed under the provisions of the Wildlife Protection Act of 1972. State governments can notify an area with significant ecological, faunal, floral, or geomorphological value as a National Park. Once notified, all human activities and commercial exploitation within the park boundaries are strictly restricted or prohibited by law.

2. (D) No rights of people are allowed in a National Park, whereas certain rights may be allowed in a Wildlife Sanctuary.
The fundamental distinction between a National Park and a Wildlife Sanctuary lies in the extent of human rights permitted. In a National Park, no private land rights or resource collection are allowed, ensuring complete habitat protection. Conversely, limited traditional rights, such as grazing or livestock movement, may be permitted within a Wildlife Sanctuary if approved by authorities.

3. (A) To conserve avian habitats and protect native and migratory birds from hunting and habitat loss
Bird sanctuaries are specifically created ecological havens aimed at safeguarding resident and migratory bird populations from anthropogenic threats like habitat degradation and poaching. These protected areas preserve essential wetlands, nesting grounds, and feeding ecosystems. By securing uninterrupted migration corridors and breeding spaces, bird sanctuaries help preserve global avian biodiversity and maintain delicate regional ecosystem balances.

4. (A) I and II only
Under the Wildlife Protection Act of 1972, grazing of livestock is completely prohibited within National Parks, whereas Wildlife Sanctuaries can be upgraded to National Parks to provide higher legal protection. However, altering the boundaries of a Wildlife Sanctuary does not require state legislative resolutions alone; it mandates a mandatory recommendation from the National Board for Wildlife.

5. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Altering the boundaries of a National Park requires mandatory review and recommendation from the National Board for Wildlife to prevent arbitrary statutory modifications. The Wildlife Protection Act of 1972 establishes strict legal safeguards against territorial reduction by state authorities, ensuring that ecological integrity is prioritized. Therefore, the legal provisions directly explain why statutory oversight by the board is compulsory.

6. (D) State-declared areas adjacent to protected zones for landscape and habitat conservation.
Conservation Reserves are statutory protected areas declared by state governments on government-owned land, particularly in landscapes adjacent to national parks or sanctuaries. Introduced through the 2002 amendment to the Wildlife Protection Act, these reserves act as vital ecological corridors and buffer zones, protecting landscapes and habitats while involving local communities through dedicated reserve management committees.

7. (B) Scientific research and photography
The Chief Wildlife Warden has statutory authority under the Wildlife Protection Act to grant entry permits into wildlife sanctuaries for specific non-destructive purposes. These allowed activities include scientific research, wildlife photography, tourism, environmental education, and lawful transaction of official business. Commercial exploitation, logging, and mining are strictly prohibited to ensure the preservation of sanctuary ecosystems and species habitats.

8. (C) Ramsar Convention
The Ramsar Convention on Wetlands is an international treaty established in 1971 to promote the conservation and wise use of wetland habitats worldwide. Many bird sanctuaries in India are designated as Ramsar sites due to their global importance for migratory avian species. The framework provides international guidance and support to maintain the ecological character of these critical aquatic ecosystems.

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9. (A) P-3, Q-4, R-2, S-1
National Parks strictly prohibit all human interference and livestock grazing. Wildlife Sanctuaries allow restricted traditional grazing and community rights if authorized. Conservation Reserves represent state-owned lands buffering protected zones. Community Reserves consist of community or privately owned lands designated for wildlife conservation where local management committees oversee protection efforts, accurately aligning each protected area category with its specific statutory characteristic.

10. (A) Hailey National Park
Hailey National Park was established in 1936 in Uttarakhand, making it the first National Park in India and all of Asia. Created during British rule primarily to protect the endangered Royal Bengal Tiger, it was later renamed Ramganga National Park in 1954 and finally Jim Corbett National Park in 1956 to honor the famous hunter and conservationist.

11. (A) Around 1.35%
Official data from the Wildlife Institute of India indicates that National Parks cover approximately 1.35 percent of the country's total geographical area. Over one hundred officially notified National Parks are distributed across various biogeographic zones, forming the central core of India's in-situ conservation network and providing strict statutory protection to critical wildlife habitats and fragile natural ecosystems.

12. (B) Madhya Pradesh
Madhya Pradesh contains the highest number of National Parks among all Indian states, hosting eleven notified national parks within its boundaries. Renowned as the tiger state of India, its protected area network includes famous reserves like Kanha, Bandhavgarh, Pench, and Panna, which play a crucial role in conserving key flagship mammal species and diverse forest landscapes across central India.

13. (A) Hemis National Park
Hemis National Park, situated in the high-altitude trans-Himalayan region of Ladakh, is the largest National Park in India, spanning over 4,400 square kilometers. Located north of the Indus River, it is globally renowned for hosting the highest density of snow leopards in any protected area and provides critical habitat for specialized alpine wildlife species like bharal and argali.

14. (B) I, II and IV
India hosts over one hundred officially notified National Parks. Marine National Park in the Gulf of Kutch was established as the country's first marine protected area, while South Button Island National Park in the Andaman and Nicobar Islands is the smallest. Hemis National Park conserves snow leopards rather than Asiatic lions, making statements I, II, and IV correct.

15. (D) Lakhimpur Kheri
Dudhwa National Park is located in the Lakhimpur Kheri district of Uttar Pradesh, along the Indo-Nepal border in the upper Gangetic plain. Covering an expanse of dense sal forests, tall wet grasslands, and swamps, it constitutes the core area of the larger Dudhwa Tiger Reserve, providing a prime refuge for endangered species like tigers, rhinos, and swamp deer.

16. (C) 1977
Dudhwa was initially declared a wildlife sanctuary in 1958 to protect the swamp deer population. Recognizing its immense ecological value and rich biodiversity, the Government of Uttar Pradesh officially upgraded the sanctuary to a National Park in 1977. Later, in 1987, it was brought under Project Tiger coverage to establish a comprehensive multi-species conservation reserve.

17. (B) Indian Rhinoceros
Dudhwa National Park is globally famous for its highly successful Indian Rhinoceros reintroduction programme initiated in 1984. Rhinos were translocated from Assam and Nepal to establish a viable breeding population within a fenced enclosure. This initiative restored a megaherbivore species that had been locally extinct in the Terai region of Uttar Pradesh for over a century.

18. (D) Mohana
The Mohana River flows along the northern boundary of Dudhwa National Park, defining the international border between India and Nepal. Another major watercourse, the Suheli River, flows along the southern edge. These riverine networks feed the surrounding wetlands and marshy grasslands, creating the ideal hydrologic

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conditions required for the survival of swamp deer and other wildlife.

19. (B) 2014
Pilibhit Tiger Reserve was officially notified as the 45th Tiger Reserve of India by the Government of Uttar Pradesh in June 2014. Located along the Upper Gangetic Plain Terai arc landscape, the reserve spans over eight hundred square kilometers, encompassing dense sal forests, tall grasslands, and river ecosystems that support rich populations of tigers and prey species.

20. (C) Doubling wild tiger populations within a set timeframe
The prestigious international TX2 award recognizes extraordinary achievements in tiger conservation, specifically awarded to sites that double their wild tiger population within a decade. Pilibhit Tiger Reserve won this global accolade in 2020 after increasing its tiger count from twenty-five in 2014 to sixty-five in 2018, demonstrating outstanding management, habitat protection, and anti-poaching measures.

21. (A) Shahjahanpur
Pilibhit Tiger Reserve forms an expansive contiguous forest belt within the Terai landscape. While the major portion lies in the Pilibhit district, the forest area extends into the adjoining Shahjahanpur district of Uttar Pradesh. This continuous forest cover provides vital habitat connectivity and movement corridors for large carnivores, herbivores, and migratory bird populations across the region.

22. (D) Ramganga
The Ramganga River is the main hydrologic artery flowing directly through the heart of Jim Corbett National Park in Uttarakhand. Originating in the outer Himalayas, it flows through the riverine valleys of the park, supplying crucial water to wildlife and supporting rich aquatic biodiversity, including marsh crocodiles, gharials, and several native freshwater fish species.

23. (B) One-horned Rhinoceros
Kaziranga National Park in Assam is globally celebrated as the primary habitat of the endangered Great One-horned Rhinoceros. Hosting over two-thirds of the world's total wild rhinoceros population, this UNESCO World Heritage site features fertile alluvial floodplains, dense tall elephant grass, and tropical moist broadleaf forests nourished by the annual floods of the Brahmaputra River.

24. (C) Assertion (A) is true but Reason (R) is false.
Gir National Park in Gujarat remains the sole natural home of the wild Asiatic Lion population globally. However, translocation attempts to establish a secondary wild population were planned for Kuno Wildlife Sanctuary in Madhya Pradesh, not Dudhwa National Park. Therefore, while the assertion correctly describes Gir's unique ecological status, the reason contains an incorrect statement regarding lion translocation.

25. (D) Karnataka
Bandipur National Park is located in the southern state of Karnataka. Established in 1974 under Project Tiger, it forms a vital contiguous component of the Nilgiri Biosphere Reserve alongside Nagarhole National Park, Mudumalai Wildlife Sanctuary, and Wayanad Wildlife Sanctuary, creating one of the largest protected habitats for wild elephants and tigers in Southern India.

26. (A) Bharatpur Bird Sanctuary
Keoladeo Ghana National Park in Rajasthan was historically designated and widely known as the Bharatpur Bird Sanctuary. Originally constructed as a duck-hunting reserve for local royalty in the late nineteenth century, it was subsequently converted into a protected bird sanctuary and declared a UNESCO World Heritage Site due to its immense international importance for wintering migratory waterfowl.

27. (B) Monsoon runoff and controlled releases from Ajan Dam
The wetlands of Keoladeo Ghana National Park depend heavily on man-made hydrologic management. Water is fed into the shallow park depressions through monsoon canal diversions sourced from the nearby Ajan Dam, constructed at the confluence of the Gambhir and Banganga rivers. Regular seasonal water flow maintains optimal water levels necessary for breeding and wintering waterbird species.

28. (B) Brackish water lagoon
Chilika Lake, situated on the eastern coast of Odisha, is the largest brackish water lagoon in Asia and the second largest coastal lagoon globally. Connected to the Bay of Bengal, its salinity fluctuates seasonally, sustaining a rich

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ecosystem of estuarine fauna, marine species, Irrawaddy dolphins, and hundreds of thousands of wintering migratory birds.

29. (A) Dachigam, Corbett, Bandhavgarh, Bandipur
Arranging these National Parks from north to south follows clear geographic latitudes. Dachigam National Park is located farthest north in Jammu and Kashmir, followed by Jim Corbett National Park in Uttarakhand. Bandhavgarh National Park lies further south in central Madhya Pradesh, while Bandipur National Park is situated in southern Karnataka, confirming the correct spatial order from north to south.

30. (C) Unnao
The Shaheed Chandra Shekhar Azad Bird Sanctuary, historically known as Nawabganj Bird Sanctuary, is located in the Unnao district of Uttar Pradesh. Situated along the Lucknow-Kanpur highway, this protected wetland encompasses a natural lake that provides a vital resting and feeding haven for numerous resident and wintering migratory bird species traveling along regional flyways.

31. (C) 2015
The Nawabganj Bird Sanctuary was officially renamed Shaheed Chandra Shekhar Azad Bird Sanctuary in 2015 by the Government of Uttar Pradesh. The rename honored the famous Indian freedom fighter Chandra Shekhar Azad. The sanctuary remains a critical conservation site, harboring over two hundred recorded bird species alongside a dedicated deer park and public interpretation center.

32. (C) Raebareli
Samaspur Bird Sanctuary is located in the Raebareli district of Uttar Pradesh. Established in 1987, this protected wetland ecosystem comprises six interconnected natural lakes. It serves as a major breeding and wintering destination for over two hundred species of resident and migratory waterbirds, including whistling teals, spoonbills, and various species of ducks and herons.

33. (B) Gonda
Parvati Arga Bird Sanctuary is located in the Gonda district of Uttar Pradesh. Comprising two permanent oxbow lakes formed by the changing courses of the Sarayu River, this freshwater wetland was officially designated as a Ramsar site in 2019 due to its significance as a sanctuary for endangered Palearctic migratory waterfowl and resident bird species.

34. (A) I and II only
Bakhira Bird Sanctuary represents the largest natural floodplain wetland in eastern Uttar Pradesh, while Sur Sarovar Bird Sanctuary in Agra is widely known as Keetham Lake. However, Sandi Bird Sanctuary is located in the Hardoi district rather than Aligarh, making statements I and II correct while statement III is geographically inaccurate regarding the location of Sandi.

35. (A) Agra
Sur Sarovar Bird Sanctuary, surrounding Keetham Lake, is located near the city of Agra in Uttar Pradesh. Designated as a Ramsar site in 2020, this man-made reservoir hosts extensive waterfowl populations and features a specialized bear rescue facility managed in collaboration with wildlife organizations, serving as a key center for eco-tourism and wildlife rehabilitation.

36. (C) Gautam Buddha Nagar
Okhla Bird Sanctuary is located in the Gautam Buddha Nagar district of Uttar Pradesh, right at the border where the Yamuna River exits the National Capital Territory of Delhi. Positioned at the Okhla Barrage, this urban wetland ecosystem attracts thousands of migratory birds annually and acts as a crucial green sanctuary within a densely populated metropolitan landscape.

37. (A) Sandi Bird Sanctuary
Sandi Bird Sanctuary was created in 1990 to protect the rich avifauna associated with the Garra River basin in the Hardoi district of Uttar Pradesh. Centered around a natural freshwater lake, it acts as a critical wintering site for migratory waterfowl and was designated as a Ramsar site in 2019 due to its high ecological significance.

38. (D) Kannauj
Lakh Bahoshi Bird Sanctuary is situated in the Kannauj district of Uttar Pradesh. Spanning across two major natural lakes, Lakh and Bahoshi, it is one of the largest bird sanctuaries in the state. The sanctuary provides vast aquatic habitats that shelter over forty thousand

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wintering migratory birds, including jackals, blue bulls, and numerous duck species.

39. (B) Etah
Patna Bird Sanctuary is located in the Etah district of Uttar Pradesh. Covering an area of just over one square kilometer, it is recognized as the smallest bird sanctuary in the state. Despite its compact size, its rich wetland vegetation and natural lake bed attract dense winter concentrations of migratory birds and resident wetland fauna.

40. (A) P-3, Q-4, R-1, S-2
Saman Bird Sanctuary is situated in the Mainpuri district, while Bakhira Bird Sanctuary lies in Sant Kabir Nagar. Surha Taal Bird Sanctuary is located in Ballia, and Vijai Sagar Bird Sanctuary is positioned in Mahoba. Matching each bird sanctuary with its corresponding administrative district confirms the correct numerical pairing across all four designated wetland protected areas.

41. (D) Central Asian Flyway
Most long-distance migratory birds visiting northern India and Uttar Pradesh travel along the Central Asian Flyway. This vast avian migration route spans northernmost breeding grounds in Siberia and Central Asia across the Himalayas to wintering grounds in the Indian subcontinent. Wetlands in Uttar Pradesh serve as crucial stopover and wintering sites along this international migration pathway.

42. (C) October to November
The peak arrival period for migratory birds arriving in northern India from Siberia and Central Asia occurs during October and November. As freezing winter temperatures deplete food sources in northern latitudes, millions of waterfowl migrate southward across the Himalayas, overwintering in the ice-free, food-rich wetland networks of Uttar Pradesh until their spring departure in March.

43. (B) Siberian Crane
The critically endangered Siberian Crane historically migrated thousands of kilometers from Arctic Russia to winter at Keoladeo National Park in Rajasthan. Due to habitat degradation, hunting along migration routes, and population decline, the central population of Siberian Cranes became functionally extinct, and sightings of these magnificent white cranes in India ceased entirely during the early 2000s.

44. (A) 1971
The Ramsar Convention on Wetlands of International Importance was formally adopted in the Iranian city of Ramsar in February 1971. Coming into force in 1975, this intergovernmental treaty provides a framework for national action and international cooperation for the conservation and wise resource utilization of wetlands and their surrounding ecological habitats globally.

45. (C) 10
Uttar Pradesh hosts ten officially designated Ramsar sites, making it one of the leading Indian states in recognized wetlands of international importance. These sites include Nawabganj, Parvati Arga, Samaspur, Saman, Sandi, Sarsai Nawar, Sur Sarovar, Upper Ganga River, Haiderpur, and Bakhira Wildlife Sanctuary, reflecting the state's vital ecological role for migratory waterbirds.

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46. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Shallow floodplain wetlands in Uttar Pradesh undergo seasonal drying during summer, followed by monsoon inundation. This natural wetting and drying cycle stimulates lush aquatic plant growth and massive blooms of macro-invertebrates during the post-monsoon months. Abundant food resources and favorable seasonal conditions directly explain why these wetlands serve as premier wintering sites for migratory waterfowl.

47. (D) Muzaffarnagar and Bijnor
Haiderpur Wetland, added to the Ramsar list in 2021, is located along the boundary of Muzaffarnagar and Bijnor districts in Uttar Pradesh. Formed within the floodplain of the Solani and Ganga rivers near the Madhya Ganga Barrage, this human-made wetland provides critical habitat for thousands of wintering migratory birds and threatened aquatic species.

48. (C) Bakhira Sanctuary
Bakhira Wildlife Sanctuary, located in the Sant Kabir Nagar district of Uttar Pradesh, was declared a Ramsar site in 2022. As the largest natural floodplain wetland in eastern Uttar Pradesh, it provides a safe, resource-rich wintering ground and breeding habitat for

numerous Palearctic migratory bird species, waterfowl, and threatened freshwater organisms.

49. (B) Ganges Dolphin
The Upper Ganga River stretch between Brijghat and Narora was designated as a Ramsar site in 2005. This riverine habitat is crucial for the conservation of the endangered Ganges River Dolphin, India's national aquatic animal. The stretch also supports significant populations of gharials, smooth-coated otters, freshwater turtles, and over a hundred species of resident and migratory birds.

50. (D) Etawah
Sarsai Nawar Jheel is a designated Ramsar site located in the Etawah district of Uttar Pradesh. This permanent freshwater marsh is a classic example of co-existence between humans and wildlife, hosting a significant population of the vulnerable Sarus Crane, India's tallest flying bird, alongside thousands of migratory waterfowl during winter months.

51. (C) 2020
Sur Sarovar, commonly known as Keetham Lake, in the Agra district of Uttar Pradesh, was officially designated as a Ramsar site in November 2020. Recognized for its ecological importance, this human-made reservoir provides sanctuary to over one hundred species of migratory and resident birds, besides hosting a dedicated rescue facility for sloth bears.

52. (C) Wetlands provide breeding and feeding grounds through rich aquatic food webs.
Wetlands function as highly dynamic ecosystems that provide essential breeding, nesting, and foraging grounds for diverse bird populations. Rich aquatic food webs consisting of fish, invertebrates, seeds, and submersed vegetation sustain resident species and fuel long-distance migratory birds. Preserving these habitats ensures stable avian populations and maintains broader ecological connectivity across migration corridors.

53. (A) I, II and III
Nawabganj Bird Sanctuary features a deer park and wintering ducks, Parvati Arga consists of two oxbow lakes, and Samaspur comprises six interconnected lakes. However, Sandi Bird Sanctuary is fed by the Garra River, not the Gomti River. Therefore, statements I, II, and III are correct, while statement IV presents an incorrect river association for Sandi.

54. (D) In-situ conservation
The establishment of National Parks is a primary strategy for in-situ conservation, which involves protecting wild species within their natural habitats and ecosystems. Unlike ex-situ methods that safeguard organisms in artificial environments like zoos or gene banks, in-situ conservation preserves biological diversity, natural evolutionary processes, and ecological interactions directly within natural landscapes.

55. (B) National Tiger Conservation Authority
The National Tiger Conservation Authority is the statutory body under the Ministry of Environment, Forest and Climate Change authorized to issue guidelines for ecotourism in tiger reserves across India. These guidelines aim to regulate tourist footfall, minimize ecological disturbance, prevent infrastructure encroachment in core zones, and ensure local community participation in ecotourism benefits.

56. (C) Maximum tourist load a park can sustain without ecological harm.
In protected area management, carrying capacity represents the maximum level of visitor presence and tourism infrastructure an ecosystem can sustain without causing adverse ecological impacts or deteriorating wildlife behavior. Determining carrying capacity helps park authorities set daily tourist limits, regulate safari vehicles, and prevent physical degradation of fragile natural habitats within national parks and tiger reserves.

57. (D) Management Plan
A Management Plan is the core statutory document prepared for protected areas to guide administrative, conservation, and resource management strategies over a ten-year horizon. It outlines detailed baseline data, conservation objectives, ecological zonation, habitat restoration plans, anti-poaching measures, and financial allocation required to ensure long-term preservation of biodiversity and forest ecosystems.

58. (A) Wildlife Warden / Range Forest Officer
Range Forest Officers and designated Wildlife Wardens serve as frontline executive authorities responsible for daily field management, anti-

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poaching patrols, and ecological protection inside national parks and sanctuaries. Operating directly under the Chief Wildlife Warden, these field officers enforce legal provisions under the Wildlife Protection Act, manage frontline staff, and mitigate human-wildlife conflicts in reserve areas.

59. (A) II, III, I, IV
Formulating a Management Plan for a Protected Area follows a structured logical sequence. Authorities begin by reviewing past management and surveying ecological baselines. Next, long-term and short-term conservation objectives are established. Protected area zonation is then conducted to demarcate management zones. Finally, the draft plan is finalized and submitted for official approval by the Chief Wildlife Warden.

60. (B) Strictly conserved as an inviolate area dedicated to wildlife habitat.
The Core Zone of a National Park or Tiger Reserve is legally defined as an inviolate space where human disturbances, forestry operations, resource extraction, and commercial tourism are strictly prohibited. Dedicated exclusively to wildlife conservation, this core area maintains untouched natural habitats essential for breeding, sheltering, and sustaining viable populations of sensitive and endangered wild species.

61. (A) 4
The Wildlife Protection Amendment Act of 2022 restructured and rationalized the schedules of the original 1972 Act, reducing the total number of schedules from six to four. Schedules I and II protect species with varying degrees of threat, Schedule III covers protected plant species, and Schedule IV governs specimens listed under CITES international trade regulations.

62. (C) Highest legal protection with maximum statutory penalties.
Wild animals listed in Schedule I of the amended Wildlife Protection Act receive the highest level of legal protection under Indian law. Offenses involving Schedule I species attract the most severe statutory penalties, including mandatory imprisonment and heavy fines. Absolute prohibition applies to hunting or capturing these animals across India, except under extreme authorized management circumstances.

63. (D) The Central Government
Under the Wildlife Protection Act of 1972, the authority to declare specified wild animals as vermin for a designated period and geographic area rests exclusively with the Central Government. Once declared vermin, restrictions on hunting those specific animals are temporarily relaxed to manage serious agricultural damage or public safety threats without altering their overall statutory conservation status.

64. (A) P-3, Q-4, R-1, S-2
The Chief Wildlife Warden is the statutory state authority controlling wildlife management, while the State Board for Wildlife serves as an advisory body chaired by the Chief Minister. The National Board for Wildlife is the apex national body chaired by the Prime Minister, and Eco-Sensitive Zones act as buffer shock absorbers outside protected boundaries.

65. (B) Man and the Biosphere (MAB) Programme
The global concept of Biosphere Reserves was launched by UNESCO in 1971 under its Man and the Biosphere Programme. This intergovernmental scientific initiative promotes balanced relationships between human communities and ecosystems by integrating natural resource conservation with sustainable socio-economic development, scientific research, and environmental education across designated terrestrial and coastal reserves worldwide.

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66. (D) Core Zone
A Biosphere Reserve comprises three main spatial zones: core, buffer, and transition. The Core Zone is legally protected and kept strictly inviolate, prohibiting human settlement, livestock grazing, and resource extraction. It is dedicated entirely to nature conservation and non-destructive scientific monitoring to ensure undisturbed baseline ecological processes and wild species survival across the landscape.

67. (A) Nilgiri Biosphere Reserve
The Nilgiri Biosphere Reserve was established in 1986 as the first Biosphere Reserve in India. Spanning over five thousand square kilometers across the Western Ghats in Tamil Nadu, Kerala, and Karnataka, it encompasses diverse forest ecosystems and protected areas, serving as a critical habitat for endangered species like the Nilgiri tahr and lion-tailed macaque.

68. (C) National Parks prohibit human settlement, while Biosphere Reserves permit it in outer zones.
National Parks enforce complete legal exclusion of permanent human settlements and traditional resource collection within their boundaries to maintain undisturbed wildlife habitats. In contrast, Biosphere Reserves adopt a broader landscape approach, prohibiting human settlement only within the core zone while permitting regulated settlements, traditional agriculture, and sustainable economic activities in their outer buffer and transition zones.

69. (A) Critical Wildlife Habitats
Critical Wildlife Habitats are designated under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act of 2006. These areas within national parks and sanctuaries are identified as required to be kept inviolate for wildlife conservation, where forest rights can be modified or resettled after fulfilling statutory consultation and consensus procedures.

70. (B) I and III only
A Biosphere Reserve encompasses extensive landscapes containing multiple national parks and sanctuaries while focusing on balancing wildlife protection with sustainable community development. However, National Parks are legally declared under the Wildlife Protection Act of 1972 rather than the Environment Protection Act of 1986, making statements I and III correct while statement II contains a legal misconception.

71. (B) Principal Chief Conservator of Forests
The Principal Chief Conservator of Forests (Head of Forest Force) serves as the administrative head of the Forest and Wildlife Department in Uttar Pradesh. Responsible for overall policy implementation, administrative control, forest management, and wildlife conservation across the state, this senior officer leads the executive hierarchy of the state forest service administration.

72. (C) Conservator of Forests
In the organizational structure of state forest departments, a Forest Circle comprises several territorial or wildlife forest divisions. A Forest Circle is headed by an officer of the rank of Conservator of Forests or Chief Conservator of Forests, who exercises administrative oversight, supervises Divisional Forest Officers, and coordinates regional forestry and conservation programs.

73. (D) Chief Wildlife Warden
Under Section 11 of the Wildlife Protection Act of 1972, the Chief Wildlife Warden of a state holds exclusive statutory authority to permit hunting or capture of a Schedule I wild animal if it becomes dangerous to human life or disabled beyond recovery. This power cannot be exercised arbitrarily by other administrative or local authorities.

74. (A) To provide alternative livelihoods and reduce forest dependence.
Eco-Development Committees are participatory community institutions established around protected areas to reduce local dependence on forest resources. By implementing alternative livelihood schemes, promoting sustainable micro-enterprises, and offering eco-tourism opportunities, these committees alleviate biotic pressure on core wildlife habitats while fostering collaborative local partnerships in biodiversity conservation and natural resource management.

75. (B) 1990s
The Government of India officially released comprehensive national guidelines for Joint Forest Management in June 1990. This landmark initiative established formal frameworks for involving local village communities and non-governmental organizations in the protection, regeneration, and sustainable management of degraded forest lands, sharing produce benefits directly with participating local forest protection committees.

76. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Eco-Development Committees play a critical role in mitigating human-wildlife conflict around tiger reserves. By actively involving fringe communities in park conservation and distributing ecotourism revenues, these committees create economic benefits and foster local ownership, directly explaining why retaliatory killings of wild animals decrease and community tolerance towards wildlife increases near protected boundaries.

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77. (A) RESOURCESAT
The Forest Survey of India extensively utilizes Indian Remote Sensing satellites from the RESOURCESAT series for biennial national forest cover assessments. Equipped with advanced sensors like LISS-III and AWiFS, these satellites provide high-resolution imagery used to map forest density changes, monitor canopy health, track deforestation, and manage protected area landscapes across the nation.

78. (C) Normalized Difference Vegetation Index
The Normalized Difference Vegetation Index is the standard remote sensing index used to measure vegetation greenness, canopy cover, and health in protected areas. Calculated from red and near-infrared satellite spectral bands, it allows scientists and forest managers to quantify plant biomass density, track seasonal phenology, and monitor habitat degradation over long temporal scales.

79. (D) M-STrIPES
M-STrIPES, standing for Monitoring System for Tigers - Intensive Protection and Ecological Status, is a digital patrolling and monitoring tool launched by the National Tiger Conservation Authority. It uses mobile software and spatial databases to track field patrols by forest guards, record wildlife sightings, monitor poaching threats, and assess habitat conditions in real time.

80. (B) I, III and IV
M-STrIPES uses GPS logs to track field patrolling intensity, camera traps capture nocturnal wildlife using infrared sensors, and satellite imagery monitors seasonal water body changes. However, drone technology is not legally banned; it is actively deployed by authorities for anti-poaching and surveillance. Thus, statements I, III, and IV are correct.

81. (C) 205
According to the official Status of Tigers in India 2022 report released by the National Tiger Conservation Authority, the estimated wild tiger population in Uttar Pradesh rose to 205 individuals. This population growth reflects effective protection efforts, habitat management, and improved tiger corridors across major reserves like Dudhwa, Pilibhit, Amangarh, and surrounding forest divisions.

82. (C) 1980s
The historic Rhino Reintroduction Programme in Dudhwa National Park was launched in 1984. Five Indian Rhinoceroses were initially translocated from Assam, followed by additional individuals from Nepal, establishing a fenced reintroduction area. This successful conservation initiative brought the species back to the Terai region of Uttar Pradesh after more than a century of local extinction.

83. (A) Bandipur National Park
Kaziranga National Park, Keoladeo National Park, and Great Himalayan National Park are designated UNESCO Natural World Heritage Sites in India. In contrast, Bandipur National Park in Karnataka, while a major tiger reserve and part of the Nilgiri Biosphere Reserve, does not hold individual status as a UNESCO World Heritage Site.

84. (C) Ecological character has changed or is threatened by human impact.
Inclusion of a wetland on the Montreux Record under the Ramsar Convention indicates that adverse changes in its ecological character have occurred, are occurring, or are likely to occur due to technological developments, pollution, or human interference. It highlights international conservation priority and assists governments in applying targeted restoration measures to threatened sites.

85. (A) Dudhwa, Amangarh, Pilibhit, Ranipur
Dudhwa Tiger Reserve was notified first in 1987, followed by Amangarh Tiger Reserve as a buffer to Corbett in 2012. Pilibhit Tiger Reserve was officially notified in 2014, while Ranipur Tiger Reserve in Chitrakoot was declared in 2022 as the fourth tiger reserve in Uttar Pradesh, establishing the correct chronological sequence from earliest to latest.

86. (D) January
The Asian Waterbird Census is an annual international waterbird monitoring effort conducted across India every January. Coordinated locally by organizations like the Bombay Natural History Society, thousands of volunteers and ornithologists count waterbirds across wetlands to gather critical data on population trends, habitat health, and migratory bird distributions during mid-winter.

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87. (B) Line Transect Method
The Line Transect Method is a widely applied distance sampling technique in wildlife ecology. Surveyors walk or drive along predetermined straight paths at a steady speed, recording sightings of animals or birds along with their perpendicular distance from the line. Statistical software then processes these measurements to estimate overall population density and abundance.

88. (C) Acoustic point counts
In dense forest canopies where visual sighting of birds is severely limited, ornithologists rely primarily on acoustic point counts. Researchers record or listen to species-specific bird vocalizations at fixed locations over set time intervals. Audio detection enables accurate identification and population estimation of elusive canopy species without requiring visual contact through thick foliage.

89. (A) P-3, Q-4, R-2, S-1
Camera trapping allows individual identification of large carnivores like tigers through unique stripe patterns. Point counts record songbirds within fixed radii, dung decay counts estimate herbivore densities, and mist netting safely captures small flying birds for study. Matching each census technique with its target application establishes the correct numerical order across all pairs.

90. (A) A citizen-science portal for recording bird observations.
eBird is a global online citizen-science platform managed by the Cornell Lab of Ornithology. It allows birdwatchers, researchers, and naturalists to submit real-time bird sightings, checklist data, and personal observations. This vast crowdsourced database aids scientists in tracking avian distribution patterns, seasonal migration timing, and long-term population trends across India and globally.

91. (B) The State Government
Under the Wildlife Protection Act of 1972, the State Government holds statutory authority to issue official notifications upgrading a Wildlife Sanctuary to a National Park. This upgrade is performed when an area possesses sufficient ecological, faunal, floral, or geomorphological value requiring complete legal prohibition of human rights and enhanced habitat protection measures.

92. (B) National Board for Wildlife
According to statutory provisions under the Wildlife Protection Act of 1972, no alteration of the boundaries of a National Park can be executed by any authority without obtaining a formal recommendation from the National Board for Wildlife. This strict legal requirement protects national parks from arbitrary territorial reduction and habitat fragmentation.

93. (A) Prime Minister of India
The National Board for Wildlife is the apex statutory advisory body for wildlife conservation in India, established under the Wildlife Protection Act of 1972. The Prime Minister of India serves as its ex-officio Chairperson. The board frames national policies, reviews wildlife matters, and evaluates infrastructure proposals in and around national parks and sanctuaries.

94. (C) Chief Minister
The State Board for Wildlife is a statutory advisory body constituted in each state under the Wildlife Protection Act of 1972. The Chief Minister of the respective state serves as its ex-officio Chairperson. The board advises state government administration on selection, management, and protection of designated protected areas and wildlife habitats.

95. (B) II and III only
The National Board for Wildlife is a statutory body constituted under the Wildlife Protection Act of 1972, not the Environment Protection Act of 1986. The board reviews wildlife policies and development projects near protected areas, while the State Board for Wildlife meets at least twice annually to advise state authorities, confirming statements II and III.

96. (C) Conservation Reserves are on public land; Community Reserves are on private/community land.
The primary legal distinction between Conservation Reserves and Community Reserves lies in land ownership. Conservation Reserves are declared by state governments on government-owned public land, typically buffering national parks. Conversely, Community Reserves are established on private or community-owned lands where local individuals or village councils

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voluntarily agree to conserve natural ecosystems and wildlife habitats.

97. (B) Ladakh
Hemis National Park is located in the union territory of Ladakh, situated in the high-altitude trans-Himalayan region north of the Indus River. Spanning over four thousand square kilometers, it is globally famous for harboring the world's highest density of snow leopards within a single protected area and safeguarding unique high-altitude mountain wildlife species.

98. (D) Andaman and Nicobar Islands
South Button Island National Park is located in the Andaman and Nicobar Islands territory of India. Encompassing an extremely small land area, this island reserve is part of the Rani Jhansi Marine National Park complex and is celebrated for its pristine shallow oceanic waters, rich coral reef formations, sea turtles, and diverse marine life.

99. (A) Gulf of Kutch
India's first Marine National Park was established in 1982 in the Gulf of Kutch along the coast of Gujarat. Protecting fragile intertidal zones, mangroves, and coral reefs across forty-two islands, this marine sanctuary safeguards diverse marine organisms, including sea anemones, sponges, dugongs, giant sea clams, and multiple species of migratory shorebirds.

100. (C) Loktak Lake
Keibul Lamjao National Park is situated on Loktak Lake in the northeastern state of Manipur. Globally unique as the world's only floating national park, its ecosystem consists of floating vegetative masses called phumdis. This park serves as the last remaining natural home of the endangered Sangai deer, also known as the Manipur brow-antlered deer.

101. (A) Kishanpur and Katarniaghat
Dudhwa Tiger Reserve in Uttar Pradesh comprises three contiguous protected areas: Dudhwa National Park, Kishanpur Wildlife Sanctuary, and Katarniaghat Wildlife Sanctuary. Together, these reserves cover an expansive Terai landscape of moist deciduous sal forests, marshes, and alluvial grasslands that support key populations of tigers, rhinos, elephants, and aquatic species.

102. (D) Bahraich
Katarniaghat Wildlife Sanctuary is located in the Bahraich district of Uttar Pradesh along the Indo-Nepal border. Functioning as a vital core component of the Dudhwa Tiger Reserve, its riverine ecosystem along the Girwa River provides essential habitat connectivity for tigers, elephants, gharials, and freshwater dolphins migrating across transboundary landscapes.

103. (B) Terai wet grasslands and sal forests
The geography and vegetation of Dudhwa National Park belong to the classic Terai ecosystem of the Himalayan foothills. Characterized by dense moist deciduous sal forests, extensive wet alluvial grasslands, and seasonal riverine marshes, this habitat supports specialized megaherbivores like swamp deer and rhinos alongside apex carnivores across northern Uttar Pradesh.

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104. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
The Terai landscape of Dudhwa and Pilibhit provides ideal habitat conditions for the endangered Swamp Deer. Barasingha rely heavily on tall wet grasslands, marshy depressions, and waterbodies for feeding on aquatic vegetation and hiding from predators. These ecological requirements explain why the swampy Terai region remains their primary surviving stronghold in northern India.

105. (D) Sharda
The Sharda River forms the northeastern boundary of the Pilibhit Tiger Reserve in Uttar Pradesh. The river's impoundment creates the scenic Sharda Sagar Reservoir, home to the Chuka eco-tourism beach. This riverine ecosystem feeds surrounding marshy habitats and serves as a primary freshwater source for wildlife inhabiting the forest reserve.

106. (A) Mahavir Swami Wildlife Sanctuary
Mahavir Swami Wildlife Sanctuary, covering an area of approximately five square kilometers in the Lalitpur district of Uttar Pradesh, is the smallest wildlife sanctuary in the state. Established in 1977, it protects dry deciduous forests and local fauna, including leopards, hyenas, wild boars, and diverse bird species across the Bundelkhand plateau.

107. (B) Hastinapur Wildlife Sanctuary
Hastinapur Wildlife Sanctuary is the largest wildlife sanctuary in Uttar Pradesh by geographical area, covering over two thousand square kilometers across districts including Meerut, Bijnor, Amroha, and Muzaffarnagar. Situated along the Ganga river basin, it conserves extensive wetland habitats, swampy grasslands, and endangered species like swamp deer and Gangetic dolphins.

108. (B) Mirzapur and Sonbhadra
Kaimoor Wildlife Sanctuary is located across the Mirzapur and Sonbhadra districts in southeastern Uttar Pradesh, along the Vindhyan hill range. Known for its rugged dry deciduous forests, scenic waterfalls, and ancient cave paintings, the sanctuary provides crucial protection to species like blackbucks, leopards, chinkaras, and various resident raptor populations.

109. (A) Chitrakoot
Ranipur Tiger Reserve is located in the Chitrakoot district of Uttar Pradesh, within the dry deciduous forest landscape of the Bundelkhand region. Approved as the 53rd Tiger Reserve in India and the fourth in Uttar Pradesh, it acts as a critical corridor and refuge for tigers dispersing from nearby Panna Tiger Reserve in Madhya Pradesh.

110. (A) P-3, Q-4, R-1, S-2
Dudhwa Tiger Reserve contains the Mohana and Suheli rivers, Pilibhit is bounded by the Sharda River near Chuka beach, Amangarh acts as a buffer to Corbett in Bijnor, and Ranipur is situated in the Bundelkhand region. Matching each reserve with its primary geographic feature confirms the correct sequential pairing across all entries.

111. (D) Corbett National Park
Amangarh Tiger Reserve, located in the Bijnor district of Uttar Pradesh, originally formed part of Jim Corbett National Park before state reorganization. Retained by Uttar Pradesh, it now serves as an essential buffer zone and ecological corridor, allowing tigers, wild elephants, and other megafauna to move seamlessly across the Corbett landscape network.

112. (C) Ramganga National Park
India's oldest national park was established in 1936 as Hailey National Park. Following independence, it was briefly renamed Ramganga National Park in 1954, taking the name of the major river flowing through its boundary. In 1956, it was officially renamed Jim Corbett National Park to honor the renowned author, naturalist, and conservation activist.

113. (B) Madhya Pradesh
Bandhavgarh National Park is located in the Umaria district of Madhya Pradesh. Nestled within the Vindhyan hill range, it is famous worldwide for supporting one of the highest densities of Royal Bengal Tigers in the wild. Its landscape features steep sandstone cliffs, dense sal forests, open grasslands, and ancient archaeological structures.

114. (D) I, II, III and IV
All four listed pairs correctly match national parks with their flagship species. Gir National Park protects the Asiatic Lion, Kaziranga conserves the One-horned Rhinoceros, Dachigam in Jammu and Kashmir is home to the Hangul stag, and Keibul Lamjao in Manipur safeguards the Sangai deer, verifying that all statements are accurate.

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115. (A) Goa
Salim Ali Bird Sanctuary is situated on Chorao Island along the Mandovi River in Goa. Named after the distinguished Indian ornithologist Dr. Salim Ali, this low-lying estuarine mangrove habitat protects diverse resident and migratory bird species, mudskippers, fiddler crabs, and flying foxes thriving within rich intertidal wetland ecosystems.

116. (C) Karnataka
Ranganathittu Bird Sanctuary is located in the Mandya district of Karnataka, along the banks of the Kaveri River near Mysuru. Comprising six small riverine islets, it is the largest bird sanctuary in the state and serves as an important nesting site for painted storks, pelicans, spoonbills, and breeding colonies of marsh crocodiles.

117. (A) Vedanthangal Bird Sanctuary
Vedanthangal Bird Sanctuary, located in the Chengalpattu district of Tamil Nadu, is recognized as the oldest water bird sanctuary in India, with local protection history dating back over two centuries. Formally protected by government notifications, this freshwater tank ecosystem annually hosts thousands of migratory

waterbirds, including cormorants, egrets, herons, and ibises.

118. (D) Gujarat
Nalsarovar Bird Sanctuary is situated in the state of Gujarat, located southwest of Ahmedabad. Covering a large natural shallow lake and surrounding marshes, it represents the largest wetland bird sanctuary in Gujarat. The sanctuary attracts vast wintering flocks of flamingos, pelicans, ducks, cranes, and shorebirds migrating along the Central Asian Flyway.

119. (B) Great Indian Bustard
Sur Sarovar Bird Sanctuary in Agra acts as a wintering wetland refuge for migratory waterfowl like Northern Pintails, Greylag Geese, and Bar-headed Geese. The Great Indian Bustard is a terrestrial grassland species found primarily in dry scrublands of Rajasthan and Gujarat, and does not inhabit or migrate to wetland sanctuaries like Sur Sarovar.

120. (C) Sarus Crane
Saman Bird Sanctuary, an oxbow lake wetland situated in the Mainpuri district of Uttar Pradesh, is celebrated for protecting a substantial population of the Sarus Crane. Designated as a Ramsar site, this wetland ecosystem provides critical foraging and nesting grounds for these large resident cranes alongside thousands of seasonal migratory waterfowl.

121. (D) Gautam Buddha Nagar
Surajpur Wetland and Bird Sanctuary is located in Greater Noida within the Gautam Buddha Nagar district of Uttar Pradesh. Serving as a critical urban green lung and biodiversity refuge in the National Capital Region, this protected marshland supports native flora, resident waterbirds, and numerous wintering migratory avian species throughout the year.

122. (A) Bar-headed Goose
The Bar-headed Goose is famous for executing one of the highest-altitude bird migrations globally, flying directly over the high peaks of the Himalayas from high-altitude breeding grounds in Central Asia and Mongolia. These resilient geese cross high mountain passes to reach wintering wetlands across northern India, including several sanctuaries in Uttar Pradesh.

123. (B) Doyang Reservoir
The Doyang Reservoir in Nagaland is globally recognized as the mass roosting capital for Amur Falcons during their autumn passage migration. Millions of these raptors stop over in Nagaland to feast on insects before embarking on an extraordinary non-stop oceanic flight across the Indian Ocean to their wintering grounds in Southern Africa.

124. (B) 1%
Under Criterion 6 of the Ramsar Convention for identifying Wetlands of International Importance, a site qualifies if it regularly supports one percent or more of the individuals in a population of a single species or subspecies of waterbird. Meeting this threshold highlights the site's critical ecological role in sustaining global avian populations.

125. (C) 2019
In 2019, six prominent bird sanctuaries in Uttar Pradesh—Nawabganj, Sandi, Samaspur, Saman, Parvati Arga, and Sarsai Nawar—were officially designated as Ramsar sites simultaneously. This recognition elevated Uttar Pradesh's position in global wetland conservation, highlighting the international importance of its Gangetic plain oxbow lakes and seasonal freshwater marshes for migratory birds.

126. (C) Bakhira Sanctuary
Unlike typical Gangetic wetlands formed as river oxbow lakes, Bakhira Wildlife Sanctuary in Sant Kabir Nagar district is a natural freshwater floodplain lake occupying a vast tectonic structural depression. This permanent natural lake provides a vast open water body and marshland that attracts thousands of migratory waterfowl traveling along Central Asian flyways.

127. (D) Palearctic Realm
Bakhira Wildlife Sanctuary serves as a crucial wintering site for migratory waterbirds arriving from the Palearctic biogeographic realm. During winter months, cold temperatures across Europe, northern Asia, and Siberia drive species like gadwalls, teals, and pochards southward to feed and shelter in the warm, nutrient-rich wetlands of eastern Uttar Pradesh.

128. (A) I, II, III, IV
Ordering these Ramsar sites geographically from west to east follows their longitudinal

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distribution in Uttar Pradesh. Upper Ganga River (Brijghat to Narora) lies furthest west, followed by Sur Sarovar in Agra. Moving eastward leads to Nawabganj Bird Sanctuary in Unnao, and finally Parvati Arga Bird Sanctuary in Gonda, validating the sequential order.

129. (B) Groundwater recharge
Wetlands designated as Ramsar sites provide essential ecosystem services to surrounding agricultural and human settlements in Uttar Pradesh. Primary among these is groundwater recharge, as wetland basins retain surface runoff and slow water movement, allowing percolation into underlying aquifers. They also filter nutrients, regulate local microclimates, and mitigate seasonal flooding.

130. (D) Agricultural runoff containing nitrogen and phosphorus
Eutrophication in wetlands like Keetham and Nawabganj is primarily caused by agricultural runoff carrying synthetic fertilizers rich in nitrogen and phosphorus. Excess nutrient input triggers explosive growth of algae and floating plants, depleting dissolved oxygen levels upon decomposition and severely degrading aquatic habitats essential for fish, waterfowl, and benthic organisms.

131. (A) Water Hyacinth
Water Hyacinth is an aggressive invasive aquatic weed that poses a major threat to wetlands and bird sanctuaries in Uttar Pradesh. Forming dense, impenetrable mats across open water surfaces, it blocks sunlight, drastically reduces dissolved oxygen levels, disrupts native aquatic flora, and restricts swimming and foraging activities of migratory waterfowl.

132. (C) 1973
Project Tiger was officially launched by the Government of India in April 1973 from Jim Corbett National Park. Aimed at stemming the rapid decline of wild tiger populations, this landmark conservation program established dedicated tiger reserves with protected core areas, helping restore habitats and rebuild predator and prey populations across India.

133. (B) 1972
The Wildlife Protection Act was enacted by the Indian Parliament in 1972. Providing the legal foundation for wildlife conservation, the Act establishes statutory frameworks for declaring national parks, sanctuaries, conservation reserves, and community reserves. It also lists protected animal and plant species under schedules, regulating wildlife trade and penalizing poaching offenses.

134. (A) I and II only
Inside National Parks, all private land rights, livestock grazing, and resource collection are extinguished by law. In Wildlife Sanctuaries, the Chief Wildlife Warden may authorize limited traditional rights if wildlife is unharmed. However, Conservation Reserves do not require complete human vacation, making statements I and II correct while statement III is inaccurate.

135. (B) Environment (Protection) Act, 1986
Eco-Sensitive Zones around National Parks and Wildlife Sanctuaries are officially notified by the Ministry of Environment, Forest and Climate Change under the provisions of the Environment Protection Act of 1986. These zones regulate industrial development, mining, and commercial activities to act as shock absorbers protecting delicate core wildlife habitats.

136. (C) 10 km
Following directives from the Supreme Court of India and guidelines issued by the Ministry of Environment, Forest and Climate Change, a default radius of ten kilometers around national parks and sanctuaries is maintained as an Eco-Sensitive Zone in cases where site-specific customized boundary notifications have not yet been formally issued.

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137. (D) Tourism Zone
In protected area management plans, the designated area set aside for controlled public visitation and wildlife safaris is designated as the Tourism Zone or Ecotourism Zone. Situated primarily within buffer areas or designated fringe sections of national parks, this zone allows regulated educational entry while protecting fragile core areas from disturbance.

138. (A) The State Government
Under Section 4 of the Wildlife Protection Act of 1972, the State Government holds statutory authority to appoint a Chief Wildlife Warden for the state. Serving as the chief executive officer for wildlife administration, this authority enforces legal provisions, manages wildlife sanctuaries and

national parks, and oversees species protection across the state.

139. (B) The State Government with NTCA approval
A Tiger Reserve is officially notified by the State Government under Section 38V of the Wildlife Protection Act of 1972, following mandatory approval and recommendation from the National Tiger Conservation Authority. This procedure ensures both state administrative oversight and central scientific standards in declaring core and buffer zones for tiger protection.

140. (C) 2006
The National Tiger Conservation Authority was established as a statutory body through an amendment to the Wildlife Protection Act of 1972 enacted in 2006. Created following recommendations of the Tiger Task Force, NTCA oversees Project Tiger, enforces scientific standards for reserve management, and approves tiger conservation plans across Indian states.

141. (A) Van Gujjar
The Van Gujjars are a traditional nomadic pastoralist community residing along the Shivalik hills and Terai forests of northern India, including areas around Rajaji and Dudhwa national parks. Seasonally moving buffalo herds between lowland forests and alpine pastures, discussions regarding their voluntary relocation and forest rights continue under national conservation guidelines.

142. (C) Solar-powered electric fencing
Installing solar-powered electric fencing along protected area boundaries is a widely utilized non-lethal structural technique to mitigate human-elephant conflict. Delivering a harmless high-voltage, low-current shock, these fences effectively deter wild elephants from crop-raiding and entering nearby human settlements, thereby reducing agricultural damage and preventing retaliatory encounters between villagers and wildlife.

143. (D) State Disaster
Uttar Pradesh became one of the pioneering states in India to declare human-wildlife conflict as a notified State Disaster. This legal designation facilitates prompt financial compensation disbursement from the State Disaster Response Fund to victims of animal attacks or crop damage, streamlining relief administration and fostering greater community support for wildlife conservation efforts.

144. (B) The sequence correctly represents the administrative hierarchy from state level down to the range level.
The sequence accurately outlines the executive administrative hierarchy within the Uttar Pradesh Forest Department. The Principal Chief Conservator of Forests leads state-level policy, followed by the Conservator of Forests overseeing forest circles. The Divisional Forest Officer manages forest divisions, while the Range Forest Officer serves as the primary executive officer at range levels.

145. (B) Ecotourism gate receipts and government development schemes.
Eco-Development Committees operating near tiger reserves draw sustained funding primarily from dedicated percentages of ecotourism entrance gate receipts and integrated government rural development schemes. These funds finance local community welfare projects, micro-credit facilities, and alternative livelihood training programs, ensuring that local economic benefits are directly linked to protected area conservation success.

146. (D) For aerial surveillance, anti-poaching, and fire monitoring.
Unmanned Aerial Vehicles or drones are increasingly deployed by forest departments for aerial surveillance, anti-poaching operations, and forest fire monitoring across national parks. Drones provide real-time thermal and optical imagery of remote, inaccessible terrains, enabling wildlife managers to track illegal human encroachments, monitor wildlife herds, and detect forest fires early.

147. (A) Camera trapping
In modern tiger population estimation, statistical capture-recapture models are combined with camera trapping techniques. Motion-triggered camera traps photo-capture individual tigers, whose unique stripe patterns act like human fingerprints. Repeated photographic recaptures over systematic grids enable statisticians to calculate precise population density estimates across forest landscapes without physically handling animals.

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148. (C) High subjectivity and errors from overlapping tracks and soil variation.
The traditional pugmark census method relied on tracing tiger paw impressions on soil or glass plates. However, it was largely phased out due to high subjective error, variations in soil substrate texture, and overlapping track prints, which often led to overestimating tiger counts. It was replaced by scientifically robust camera-trap capture-recapture methods.

149. (A) Biodiversity Information Management System
The acronym BIMS stands for Biodiversity Information Management System in protected area management databases. BIMS platforms integrate spatial mapping, flora and fauna records, threat monitoring data, and ecological research into a centralized software framework, assisting park managers and policy makers in making data-driven decisions for habitat protection and wildlife conservation.

150. (D) Khangchendzonga National Park
Khangchendzonga National Park in Sikkim is India's only site designated under the UNESCO World Heritage 'Mixed' category, recognizing both exceptional natural biodiversity and deep cultural heritage. Encompassing glaciers, high alpine valleys, and sacred peaks centered around Mount Khangchendzonga, it holds immense ecological value alongside spiritual significance for local indigenous communities.

151. (A) 1971
UNESCO's Man and the Biosphere Programme was officially launched in 1971 as an intergovernmental scientific initiative. MAB aims to establish a scientific basis for enhancing relationships between human societies and their surrounding environments. It introduced the global network of Biosphere Reserves to harmonize biodiversity conservation with sustainable socio-economic development and research.

152. (B) 1988
Nanda Devi National Park in Uttarakhand was inscribed as a UNESCO World Heritage Site in 1988. Situated around the peak of Nanda Devi, this high-altitude wilderness area protects unique Himalayan flora and fauna, including snow leopards and Himalayan musk deer. In 2005, the inscription was expanded to include the adjacent Valley of Flowers.

153. (B) 1987
Sundarbans National Park in West Bengal was inscribed as a UNESCO World Heritage Site in 1987. Protecting the world's largest contiguous mangrove forest, this coastal wetland ecosystem provides critical habitat for the Royal Bengal Tiger, estuarine crocodiles, and river dolphins, functioning as a vital buffer against coastal storms and tidal erosion.

154. (A) Direct visual encounter count
Direct visual encounter counting is the standard method used by ornithologists to estimate wintering waterbird populations on open lakes. Researchers establish vantage points equipped with high-powered binoculars or spotting scopes to systematically count congregating waterbird flocks, grouping birds by species block-counts across open water surfaces and shoreline feeding zones.

155. (B) Call-playback method
The call-playback method is highly effective for detecting elusive, nocturnal, or marsh-dwelling bird species hidden within dense reed beds or thick forest vegetation. Researchers broadcast pre-recorded species-specific vocalizations to elicit territorial calls or visual responses from cryptic birds like rails or nightjars, enabling accurate detection during ecological field surveys.

156. (B) To study migration routes, lifespan, and population dynamics.
Ringing or bird banding involves attaching a lightweight, individually numbered metal or plastic band to a bird's leg. This standard scientific procedure allows ornithologists to track individual bird movements, determine migration corridors, estimate lifespans, assess site fidelity, and analyze demographic trends necessary for formulating effective international flyway conservation strategies.

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157. (A) Bombay Natural History Society (BNHS)
The Bombay Natural History Society, established in 1883, is a premier non-governmental organization in India pioneering ornithological research, bird ringing, and wildlife conservation. BNHS has conducted extensive bird-banding programs across the subcontinent for decades, generating crucial scientific data on avian

migration flyways, species distribution, and wetland habitat requirements.

158. (C) Coimbatore
The Salim Ali Centre for Ornithology and Natural History is located near the city of Coimbatore in Tamil Nadu. Named in honor of the famed birdman of India, Dr. Salim Ali, SACON conducts extensive scientific research, postgraduate training, and policy support dedicated to avian ecology, wetland conservation, and natural resource management.

159. (D) Dehradun
The Wildlife Institute of India is located in Dehradun, Uttarakhand. Operating as an autonomous institution under the Ministry of Environment, Forest and Climate Change, WII is an internationally acclaimed institute that provides specialized training, academic degrees, advisory support, and scientific research in wildlife management, biodiversity conservation, and protected area planning.

160. (C) Chandraprabha Wildlife Sanctuary
Established in 1957 in the Chandauli district, Chandraprabha Wildlife Sanctuary was the first wildlife sanctuary created in Uttar Pradesh. It was selected for an experimental reintroduction of Asiatic lions from Gir, Gujarat, in 1957. Although the lion population initially increased, the effort eventually failed due to inadequate long-term protection and tracking.

161. (B) Chandauli
Chandraprabha Wildlife Sanctuary is located in the Chandauli district of southeastern Uttar Pradesh, along the Vindhyan plateau. Renowned for scenic waterfalls like Rajdari and Devdari, dense dry deciduous forests, and diverse fauna, this historic sanctuary covers over seventy-eight square kilometers and provides vital habitat for leopards, hyenas, and various herbivore species.

162. (D) Shravasti, Balrampur and Gonda
Suhelwa Wildlife Sanctuary is spread across the Shravasti, Balrampur, and Gonda districts in northern Uttar Pradesh, extending along the Indo-Nepal international border. Characterized by dense tropical moist and dry deciduous sal forests, it forms a critical forest corridor linking tiger and wildlife populations between India and the Himalayan foothills of Nepal.

163. (A) Maharajganj
Sohagi Barwa Wildlife Sanctuary is located in the Maharajganj district of Uttar Pradesh, adjacent to the Valmiki Tiger Reserve in Bihar and bordering Nepal. Comprising wet alluvial grasslands, sal forests, and seasonal swamps along the Gandak river basin, it shelters key populations of tigers, leopards, rhinos, elephants, and aquatic biodiversity.

164. (C) Varanasi
The Kachhua Wildlife Sanctuary was created along a seven-kilometer stretch of the Ganga River in Varanasi, Uttar Pradesh, under the Ganga Action Plan. Established specifically to conserve freshwater turtle species, river dolphins, and avian life, it prohibits destructive river activities to maintain natural aquatic ecosystems and clean river stretches.

165. (A) Gharial and Dolphin
The National Chambal Sanctuary, tri-administered by Uttar Pradesh, Madhya Pradesh, and Rajasthan along the Chambal River, is dedicated to protecting critically endangered riverine fauna. It serves as the primary global stronghold for the critically endangered Gharial and protects significant populations of the endangered Ganges River Dolphin, mugger crocodiles, and freshwater turtles.

166. (D) Mahoba
Vijai Sagar Bird Sanctuary is located in the Mahoba district of Uttar Pradesh within the Bundelkhand region. Centered around an artificial reservoir built by local Chandela rulers in the eleventh century, this protected wetland provides crucial breeding and wintering grounds for resident waterbirds as well as migratory avian visitors.

167. (B) Aligarh
Shekha Jheel Bird Sanctuary is located in the Aligarh district of Uttar Pradesh. Formed alongside the Upper Ganga Canal, this prominent freshwater wetland is recognized as an important national bird habitat, attracting diverse species of resident and wintering migratory waterfowl, including teals, pochards, storks, and herons during winter months.

168. (C) Yamuna
Okhla Bird Sanctuary was formed following the construction of a barrage across the Yamuna

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River where it leaves Delhi to enter Gautam Buddha Nagar district, Uttar Pradesh. The resulting impoundment created rich wetland habitats, shallow waters, and reed beds that attract over three hundred species of migratory and resident birds annually.

169. (D) Lakh Bahoshi Bird Sanctuary
Lakh Bahoshi Bird Sanctuary in the Kannauj district is the largest bird sanctuary in Uttar Pradesh by geographical area, spanning over eighty square kilometers across two major natural lakes, Lakh and Bahoshi. Its vast wetland landscape provides critical habitat for over forty thousand wintering migratory waterbirds and varied wetland flora.

170. (A) About 2.4%
According to official data from the Uttar Pradesh Forest Department and the Wildlife Institute of India, the Protected Area network—comprising National Parks and Wildlife Sanctuaries—occupies approximately 2.4 percent of the state's total geographical area. This protected network forms the foundation of biodiversity conservation and ecosystem management across Uttar Pradesh.

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CHAPTER 02
Reserved Forests and Protected Forests

1. Under the Indian Forest Act, 1927, which section explicitly empowers the State Government to constitute any forest-land or waste-land as a Reserved Forest?
(A) Section 3
(B) Section 11
(C) Section 20
(D) Section 29

2. What is the fundamental legal distinction between a Reserved Forest and a Protected Forest in India?
(A) In a Reserved Forest, all activities are prohibited unless permitted, while in a Protected Forest, activities are permitted unless prohibited.
(B) In a Reserved Forest, ownership is held exclusively by the Central Government, whereas Protected Forests are owned by the State Government.
(C) In a Reserved Forest, legal boundaries are precisely surveyed and demarcated, whereas Protected Forests lack statutory boundary demarcation.
(D) In a Reserved Forest, wildlife hunting is strictly prohibited by law, whereas in Protected Forests, hunting is unconditionally permitted.

3. Under Section 28 of the Indian Forest Act, 1927, the State Government may assign to any village community the rights of Government over any land which has been constituted as a:
(A) Protected Forest
(B) Unclassed Forest
(C) Reserved Forest
(D) Private Forest

4. During the colonial period, the first attempt to regulate forests in India by asserting State monopoly over forest resources was made through which legislation?
(A) Indian Forest Act, 1865
(B) Indian Forest Act, 1878
(C) Forest Conservation Act, 1890
(D) Indian Forest Act, 1927

5. The Indian Forest Act of 1878 divided Indian forests into which of the following three categories?
(A) National, State, and Village Forests
(B) Reserved, Unclassed, and Private Forests
(C) Reserved, Protected, and Village Forests
(D) Protected, Unclassed, and Corporate Forests

6. Who is appointed by the State Government to inquire into and determine the existence, nature, and extent of any rights alleged to exist in favor of any person in or over land proposed to be constituted as a Reserved Forest?
(A) Divisional Forest Officer
(B) Forest Settlement Officer
(C) Sub-Divisional Magistrate
(D) Chief Conservator of Forests

7. According to the Indian Forest Act, 1927, once a notification under Section 4 (intention to constitute a Reserved Forest) is issued, which of the following restrictions immediately applies?
(A) All existing village settlements within the notified land area must be immediately and permanently relocated.
(B) The entire designated land area is instantly reclassified and converted into a National Park.
(C) All agricultural activities and land cultivation are permanently banned without holding any inquiry.
(D) No new right shall be acquired in or over the land comprised in the notification.

8. Under Section 20 of the Indian Forest Act, 1927, what is the final step in the process of creating a Reserved Forest?
(A) The publication of a final notification declaring the forest reserved from a specified date.
(B) The continuous physical fencing and concrete boundary marking surrounding the entire forest tract.
(C) The forced eviction and permanent resettlement of all local tribal populations living in the region.

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(D) The statutory transfer of administrative control over the land to the Ministry of Environment, Forest and Climate Change.

9. Which section of the Indian Forest Act, 1927 deals with the penalties for trespass or damage in a Reserved Forest, such as setting fire or illegally felling trees?
(A) Section 20
(B) Section 26
(C) Section 33
(D) Section 41

10. Consider the following statements regarding the Forest Settlement Officer (FSO):
I. The FSO has the powers of a Civil Court in the trial of suits.
II. The FSO can commute rights of pasture or to forest produce by granting land or money.
III. The FSO is typically a senior Indian Forest Service (IFS) officer appointed by the Central Government.
Which of the above statement(s) is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

11. What is the primary condition for declaring any land as a Protected Forest under Section 29 of the Indian Forest Act, 1927?
(A) It must be privately held agricultural or homestead land that the State Government formally wishes to acquire.
(B) It must be an uninhabited geographical territory that features completely zero human settlement or habitation.
(C) It must be an environmentally sensitive zone designated exclusively for critical tiger habitat conservation.
(D) It must be land where the Government holds proprietary rights and is not a Reserved Forest.

12. In a Protected Forest, the State Government has the power to declare any specific class of trees as reserved. This power is exercised under which section of the Indian Forest Act, 1927?
(A) Section 30
(B) Section 32
(C) Section 35
(D) Section 42

13. Which of the following statements about Unclassed Forests is most appropriate?
(A) They are forests explicitly defined and regulated under Chapter V of the Indian Forest Act, 1927.
(B) They are completely devoid of any tree cover but fall under the Forest Department.
(C) They are lands recorded as forest but not constituted as Reserved or Protected Forests.
(D) They are urban parks managed by municipal corporations.

14. Under the Indian Forest Act, 1927, if a person claims a right in or over any land proposed for a Reserved Forest, they must present their claim to the Forest Settlement Officer within a period not less than:
(A) One month from the date of the Section 4 proclamation
(B) Three months from the date of the Section 4 proclamation
(C) Six months from the date of the Section 4 proclamation
(D) Twelve months from the date of the Section 4 proclamation

15. Match the chapters of the Indian Forest Act, 1927 given in List I with their corresponding subject matter in List II**:**
List I: Chapter
P. Chapter II
Q. Chapter III
R. Chapter IV
S. Chapter V
List II: Subject Matter
1. Of Village Forests
2. Of the Control over Forests and Lands not being the Property of Government
3. Of Protected Forests
4. Of Reserved Forests
Which of the following options is correct?
(A) P-4, Q-1, R-3, S-2
(B) P-4, Q-3, R-1, S-2
(C) P-3, Q-1, R-4, S-2
(D) P-4, Q-2, R-3, S-1

16. What is the primary objective of the Forest (Conservation) Act, 1980?
(A) To nationalize all forest resources in India.
(B) To check deforestation by restricting the use of forest land for non-forest purposes.
(C) To grant exclusive timber extraction rights to local communities.
(D) To transfer the control of Reserved Forests

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from the State to the Central Government.

17. Under the Forest (Conservation) Act, 1980, which authority's prior approval is mandatory before a State Government can de-reserve any Reserved Forest?
(A) The National Green Tribunal
(B) The Central Government
(C) The State Legislature
(D) The Supreme Court of India

18. The term "non-forest purpose" under the Forest (Conservation) Act, 1980 expressly includes which of the following activities?
(A) Cultivation of tea, coffee, spices, rubber, or palms
(B) Establishment of check-posts for forest offenses
(C) Construction of bridges for wildlife movement
(D) Setting up of fire lines to prevent forest fires

19. As per the India State of Forest Report (ISFR) 2021, what is the total recorded forest area (RFA) of Uttar Pradesh as a percentage of its total geographical area?
(A) 6.15%
(B) 6.88%
(C) 9.23%
(D) 12.50%

20. Consider the following statements regarding the distribution of forests in Uttar Pradesh:
I. Sonbhadra district has the largest forest cover in the state.
II. Sant Ravidas Nagar (Bhadohi) has the lowest forest cover in the state.
III. The Terai and Bhabar regions account for the highest concentration of dense forests in UP.
IV. Open forests constitute a smaller percentage of UP's total forest cover compared to very dense forests.
Which of the above statement(s) is/are correct?
(A) I, II, and III
(B) I, II, and IV
(C) II, III, and IV
(D) I, III, and IV

21. Which district in Uttar Pradesh ranks second in terms of maximum forest cover area, following Sonbhadra?
(A) Mirzapur
(B) Pilibhit
(C) Lakhimpur Kheri
(D) Chandauli

22. In Uttar Pradesh, what is the approximate percentage share of Reserved Forests within the total Recorded Forest Area?
(A) Around 30%
(B) Around 50%
(C) Around 72.79%
(D) Around 90%

23. What is the fundamental difference in the legal status between 'Forest Cover' as measured by ISFR and 'Recorded Forest Area' (RFA)?
(A) Forest Cover incorporates strictly state-owned public lands, whereas Recorded Forest Area encompasses privately titled property and community estates.
(B) Recorded Forest Area measures exclusively legally demarcated Reserved Forests, whereas Forest Cover assesses exclusively Protected Forests and sanctuaries.
(C) There is no legal or administrative distinction between these terms, as both represent completely identical geographical forest territories.
(D) Forest Cover measures canopy density of 10% and above via satellite, while RFA denotes statutory forest area in government records.

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24. Under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, what is the cut-off date to determine eligibility for the recognition of forest rights?
(A) December 13, 2005
(B) October 30, 1980
(C) August 15, 1947
(D) December 31, 2007

25. Select the correct order of authorities involved in the process of determining forest rights under the Forest Rights Act, 2006, from the lowest to the highest level:
(A) Sub-Divisional Level Committee → Gram Sabha → District Level Committee
(B) Gram Sabha → Sub-Divisional Level Committee → District Level Committee
(C) Gram Sabha → District Level Committee → Sub-Divisional Level Committee
(D) District Level Committee → Gram Sabha → Sub-Divisional Level Committee

26. Under the Forest Rights Act, 2006, the maximum area of forest land that can be recognized and

vested as individual forest rights for occupation and cultivation is:
(A) 2 hectares
(B) 4 hectares
(C) 10 hectares
(D) No upper limit

27. The term "Community Forest Resource" (CFR) under the Forest Rights Act, 2006 primarily refers to:
(A) Forest land allocated exclusively for industrial scale commercial timber harvesting and processing by the local village community.
(B) Non-forest land formally assigned to the Gram Sabha by the State Government to promote social forestry and rural afforestation.
(C) Privately owned forest land managed and operated jointly by an association of recognized local tribal families.
(D) Customary common forest land within traditional village boundaries to which communities have access.

28. Which committee is fundamentally responsible for preparing the conservation and management plan for Community Forest Resources under the Forest Rights Act, 2006?
(A) The District Forest Advisory Committee constituted under the Chairmanship of the District Collector.
(B) The Community Forest Resource Management Committee set up by the Gram Sabha.
(C) The Joint Forest Management Committee established and supervised directly by the State Forest Department.
(D) The Sub-Divisional Level Committee functioning under the jurisdiction of the Sub-Divisional Magistrate.

29. A "Working Plan" in Indian forestry is best defined as:
(A) An official annual budget statement prepared by the Divisional Forest Officer outlining routine daily operational expenditures.
(B) A comprehensive project report submitted for the formal statutory establishment of a new regional wildlife sanctuary.
(C) A written scheme for the scientific management of a specific forest area over a 10-year period.
(D) A policy blueprint outlining administrative procedures for privatizing unclassed forest lands to private corporations.

30. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): No commercial felling is permitted in any forest without an approved Working Plan.
Reason (R): The Supreme Court of India in the T.N. Godavarman case (1996) mandated that forest working must be carried out strictly in accordance with approved Working Plans.
In the light of the above statements, choose the correct answer from the options given below:
(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

31. What is the standard duration for the validity of a standard Forest Working Plan in India?
(A) 5 years
(B) 10 years
(C) 15 years
(D) 20 years

32. Which authority is responsible for the final approval of Forest Working Plans in India?
(A) The State Chief Minister acting in consultation with the State Cabinet Ministers.
(B) The Regional Office of the Ministry of Environment, Forest and Climate Change.
(C) The Gram Sabha exercising administrative jurisdiction over the concerned district.
(D) The District Magistrate serving as the head of the District Revenue Administration.

33. Joint Forest Management (JFM) in India is a partnership concept primarily between which two entities?
(A) The Central Government and the State Government
(B) The Forest Department and the local community
(C) The Forest Department and private timber companies
(D) Non-Governmental Organizations and private landowners

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34. In the context of Joint Forest Management (JFM), what is an FDA?
(A) Forest Development Agency
(B) Federal Department of Afforestation
(C) Forest Dispute Authority
(D) Forestry Data Association

35. The concept of 'Van Panchayats' is a unique and historical model of community forest management predominantly successful in which state/region?
(A) The coastal and backwater regions of Kerala state.
(B) The arid desert and semi-arid regions of Rajasthan.
(C) The hill districts of Uttarakhand.
(D) The central alluvial plains and plateau of Madhya Pradesh.

36. In which year were the first Van Panchayat rules enacted during the British era, following the recommendations of the Forest Grievances Committee?
(A) 1878
(B) 1921
(C) 1931
(D) 1947

37. Chapter V of the Indian Forest Act, 1927 provides for the control over forests and lands not being the property of the Government. This provision allows the State Government to intervene in private forests primarily for which of the following reasons?
(A) To generate significant non-tax revenue for the state exchequer through heavy resource taxation.
(B) To acquire private forest land and redistribute it directly among landless agricultural farmers.
(C) To prevent storm damage, preserve ridge soil, and maintain spring water supply.
(D) To acquire land for constructing multi-lane national highways and industrial commercial estates.

38. If the owner of a private forest refuses to comply with the State Government's regulations issued under Chapter V of the Indian Forest Act, 1927 for protection purposes, what power does the State hold?
(A) It can permanently confiscate the land and transfer title to the state without paying any compensation.
(B) It can assume management of the forest, treating it as a Reserved Forest under compensation rules.
(C) It can order the immediate arrest and rigorous imprisonment of the property owner for up to 10 years.
(D) It can authorize the complete clearing or burning down of the forest area to eliminate illegal trade.

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39. Which of the following is NOT a recognized category of forest based on legal classification in India?
(A) Legally Notified Reserved Forest
(B) Statutory Protected Forest
(C) Government Unclassed Forest
(D) Municipal Commercial Forest

40. Consider the following statements regarding Unclassed Forests:
I. They are legally notified under a specific section of the Indian Forest Act, 1927.
II. The ownership status of Unclassed Forests can be government, corporate, or private.
III. They generally have the lowest degree of protection among the three legal classes of forests.
Which of the above statement(s) is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

41. According to the National Forest Policy of 1988, what is the targeted minimum percentage of geographical area that should be under forest or tree cover in the plains and the hills, respectively?
(A) 33% in plains and 33% in hills
(B) 20% in plains and 60% in hills
(C) 33% overall, with 20% in plains and 66% in hills
(D) 25% overall, with 10% in plains and 50% in hills

42. The National Forest Policy of 1988 marked a paradigm shift in forest management by primarily emphasizing:
(A) Environmental stability and ecological balance over economic benefit.
(B) Maximizing timber extraction revenue and commercial return for the state exchequer.
(C) Complete privatization and commercial leasing of degraded public forest lands.
(D) Promoting large-scale exotic monoculture

plantations like Eucalyptus for paper mills.

43. Under the Uttar Pradesh Forest Policy, what major strategy is adopted to increase tree cover outside the legally defined forest areas?
(A) Enforcing the Indian Forest Act on agricultural lands.
(B) Converting all urban parks into dense wildlife reserves.
(C) Banning the felling of any tree on private land permanently.
(D) Promoting Agroforestry and Social Forestry among farmers.

44. What is the fundamental purpose of Compensatory Afforestation (CA) under the Forest (Conservation) Act, 1980?
(A) To provide direct financial compensation to displaced local communities for loss of livelihood options.
(B) To plant trees on non-forest land in lieu of forest land diverted for non-forest use.
(C) To distribute timber and forest products freely to tribal populations living near industrial zones.
(D) To compensate the Forest Department for routine administrative expenses and supervisory overheads.

45. Match the forestry terms given in List I with their correct definitions in List II**:**
List I: Forestry Terms
P. Afforestation
Q. Reforestation
R. Deforestation
S. Agroforestry
List II: Definitions
1. Re-establishing forest cover on land that was recently stripped of trees.
2. Integrating trees and shrubs into crop and animal farming systems.
3. Planting trees on land that has not been forested in recent history.
4. Permanent conversion of forested land to non-forest uses.
Which of the following options is correct?
(A) P-1, Q-3, R-4, S-2
(B) P-3, Q-1, R-2, S-4
(C) P-3, Q-1, R-4, S-2
(D) P-1, Q-2, R-4, S-3

46. Under the CAMPA (Compensatory Afforestation Fund Management and Planning Authority) mechanism, what percentage of the collected funds is retained by the National Fund, with the remainder transferred to the State Funds?
(A) 5%
(B) 10%
(C) 20%
(D) 50%

47. Which technological tool is mandated by the Government of India for the transparent monitoring and evaluation of all Compensatory Afforestation works across the states?
(A) e-Green Watch (web-based GIS portal)
(B) Vahan Samanvay
(C) Bhoomi Rashi
(D) Parivesh Portal

48. In forest management, the process of marking the boundary of a forest block with permanent pillars on the ground is known as:
(A) Enumeration
(B) Demarcation
(C) Silviculture
(D) Mensuration

49. Which modern surveying technology has largely replaced the traditional chain and compass survey for accurate boundary demarcation and digital mapping of forest boundaries in Uttar Pradesh?
(A) Theodolite Surveying
(B) DGPS (Differential Global Positioning System)
(C) Plane Table Surveying
(D) Barometric Leveling

50. Consider the following statements regarding the Uttar Pradesh Forest Corporation (UPFC):
I. It was established under the Uttar Pradesh Forest Corporation Act, 1974.
II. Its primary objective is the extraction and disposal of forest produce in a scientific manner.
III. It acts as the statutory authority for enforcing the Wildlife (Protection) Act, 1972.
IV. It is responsible for the collection and marketing of tendu leaves in the state.
Which of the above statement(s) is/are correct?
(A) I, II, and III
(B) I, II, and IV
(C) II, III, and IV
(D) I, III, and IV

51. The headquarters of the Uttar Pradesh Forest Corporation is situated in which city?

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(A) Kanpur
(B) Prayagraj
(C) Lucknow
(D) Bareilly

52. Consider the following steps for diverting forest land for a non-forest project under the Forest (Conservation) Act, 1980:
1. User Agency uploads the proposal on the PARIVESH portal.
2. Central Government grants Stage-I (In-principle) approval with conditions.
3. User Agency complies with conditions (e.g., depositing CAMPA funds).
4. Central Government grants Stage-II (Final) approval.
5. State Government issues the final diversion order.

Which of the following represents the correct sequential order of these steps?
(A) 1 - 2 - 3 - 4 - 5
(B) 1 - 3 - 2 - 5 - 4
(C) 2 - 1 - 3 - 4 - 5
(D) 1 - 2 - 4 - 3 - 5

53. Encroachment of forest land is primarily dealt with under which law to evict unauthorized occupants from a legally notified Reserved Forest?
(A) The Environment (Protection) Act, 1986 and associated environmental protection rules.
(B) The Scheduled Tribes and Other Traditional Forest Dwellers (Forest Rights) Act, 2006.
(C) The Indian Forest Act, 1927 and state public premises eviction laws.
(D) The Wildlife (Protection) Act, 1972 along with national sanctuary management guidelines.

54. The process of illicit felling in a Reserved Forest constitutes a forest offense. Which forest official generally has the power to seize any timber or tools involved in the commission of a forest offense under Section 52 of the Indian Forest Act, 1927?
(A) Only the Chief Wildlife Warden
(B) Any Forest Officer or Police Officer
(C) Only the District Magistrate
(D) Only a Gazetted Officer of the Forest Department

55. Arrange the following hierarchy of Forest Department officers in Uttar Pradesh from lowest to highest rank:
1. Forest Guard
2. Forester
3. Deputy Ranger
4. Forest Ranger
5. Sub-Divisional Forest Officer (SDFO)

Select the correct sequence:
(A) 1 - 2 - 3 - 4 - 5
(B) 2 - 1 - 4 - 3 - 5
(C) 1 - 3 - 2 - 4 - 5
(D) 1 - 2 - 4 - 3 - 5

56. What is "Net Present Value" (NPV) in the context of forest land diversion?
(A) The monetary value calculated for ecological service loss due to forest land diversion.
(B) The current total market price of all commercial timber currently growing on the diverted forest land.
(C) The administrative processing fee charged by the State Government for evaluating the clearance application.
(D) The estimated annual net commercial profit expected by the user agency from developing the diverted land.

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57. Which flagship scheme was launched by the Uttar Pradesh government to massively increase tree plantation through public participation on a single day?
(A) Hariyali Mahotsav
(B) Green UP Clean UP Mission
(C) Vriksharopan Jan Andolan
(D) Sankalp Se Siddhi

58. Match the categories of forest given in List I with their descriptions as per the ISFR canopy density classification in List II**:**

List I: Category
P. Very Dense Forest (VDF)
Q. Moderately Dense Forest (MDF)
R. Open Forest (OF)
S. Scrub

List II: Description
1. Canopy density less than 10%
2. Canopy density between 10% and 40%
3. Canopy density between 40% and 70%
4. Canopy density 70% and above

Which of the following options is correct?
(A) P-4, Q-3, R-2, S-1
(B) P-3, Q-4, R-2, S-1
(C) P-4, Q-2, R-3, S-1

(D) P-1, Q-2, R-3, S-4

59. As per the ISFR 2021, the maximum portion of Uttar Pradesh's forest cover falls under which density category?
(A) Very Dense Forest
(B) Moderately Dense Forest
(C) Scrub
(D) Open Forest

60. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): The Forest Rights Act, 2006 has led to the de-reservation of vast tracts of Reserved Forests in Uttar Pradesh.
Reason (R): The FRA 2006 recognizes the historical rights of forest-dwelling communities to reside in and utilize forest resources, but it does not de-reserve the forest classification itself.
In the light of the above statements, choose the correct answer from the options given below:
(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

61. Under the Indian Forest Act, 1927, who acts as the appellate authority if a claimant's right is rejected by the Forest Settlement Officer?
(A) The Divisional Forest Officer having administrative jurisdiction over the division.
(B) The High Court of the respective State exercising extraordinary writ jurisdiction.
(C) A Forest Court or a Revenue Officer not below Collector rank.
(D) The Governor of the State acting on the advice of the State Cabinet of Ministers.

62. Which of the following acts is NOT strictly prohibited in a Reserved Forest under Section 26 of the Indian Forest Act, 1927?
(A) Clearing or breaking up any land for agricultural cultivation.
(B) Unlawfully trespassing or pasturing cattle on forest land.
(C) Quarrying stone, burning lime, or collecting forest produce.
(D) Arresting an offender committing a forest crime.

63. Under the Wildlife (Protection) Act, 1972, if an area is declared as a National Park, what happens to the rights of the people living inside?
(A) All rights are completely extinguished.
(B) Rights can continue as in a Protected Forest.
(C) Grazing rights are allowed, but timber rights are extinguished.
(D) Only government officials can reside, but villagers can farm.

64. What is the fundamental difference between a Wildlife Sanctuary and a National Park regarding the rights of people?
(A) Sanctuaries strictly permit zero human presence or entry, whereas National Parks allow regulated tourism and human habitation.
(B) In a Sanctuary, certain rights may be allowed to continue, whereas in a National Park, all rights are extinguished.
(C) Sanctuaries are established exclusively for protecting avian species, whereas National Parks are created solely for tiger conservation.
(D) There is no legal or administrative distinction between them, as both are declared fully identical under the Wildlife (Protection) Act, 1972 statutory rules.

65. The "Nagar Van Yojana" aims to create urban forests across India. These urban forests are largely developed on which type of land?
(A) Prime privately-held agricultural lands located far outside municipal boundary limits.
(B) Degraded forest lands or vacant municipal lands in or near cities.
(C) Inviolable core critical tiger habitats located within strictly protected tiger reserves.
(D) Ecologically sensitive coastal regulation zones situated exclusively along maritime shores.

66. Consider the following statements about the Forest (Conservation) Amendment Act, 2023:
I. It exempts certain categories of lands, like land situated within 100 km of international borders for strategic projects, from the Act's purview.
II. It includes provisions to encourage plantations on non-forest lands.
III. It repeals the original Forest (Conservation) Act, 1980 entirely.
IV. It officially renames the parent act to

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"Van (Sanrakshan Evam Samvardhan) Adhiniyam".

Which of the above statement(s) is/are correct?

(A) I, II, and III
(B) I, II, and IV
(C) II, III, and IV
(D) I, III, and IV

67. The "Green India Mission" (GIM) is one of the eight missions under which national action plan?

(A) Comprehensive National Biodiversity Action Plan framework.
(B) Statutory National Wildlife Action Plan strategy.
(C) National Action Plan on Climate Change.
(D) Nationwide Clean India Mission urban campaign.

68. Under the Joint Forest Management (JFM) guidelines, the local community institution formed at the village level is generally known as:

(A) District Level Zila Parishad Rural Local Government Board.
(B) Statutory State Forest Development Corporation Management Board.
(C) State Wildlife Advisory and Conservation Board of the Region.
(D) Eco-Development Committee or Forest Protection Committee.

69. In the context of resolving forest land disputes under the Indian Forest Act, 1927, which civil mechanism is typically used to update revenue records once forest land boundaries are finalized?

(A) Section 4 Notification
(B) Registration under the Companies Act
(C) Mutation (Dakhil Kharij) in the Khatauni
(D) Entering details in the Gram Panchayat register only

70. Consider the following statements regarding the Compensatory Afforestation Fund (CAF) Act, 2016:

I. It established the National and State Compensatory Afforestation Funds.
II. Funds are primarily generated from user agencies diverting forest land for non-forest purposes.
III. The funds can be freely used by the State Government for paying salaries of regular forest staff and travel expenses.

Which of the above statement(s) is/are correct?

(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

71. The "Social Forestry" scheme was heavily promoted in Uttar Pradesh to reduce pressure on traditional forests. Which international agency initially assisted the UP Social Forestry Project in 1979?

(A) Asian Development Bank
(B) United Nations Environment Programme (UNEP)
(C) Japan International Cooperation Agency (JICA)
(D) World Bank

72. Which tree species was widely planted under the Social Forestry programs in Uttar Pradesh due to its fast growth, but later faced criticism for its high water consumption and adverse ecological impacts?

(A) Eucalyptus (Safeda)
(B) Neem (Azadirachta indica)
(C) Peepal (Ficus religiosa)
(D) Sal (Shorea robusta)

73. When a State Government assigns its rights over a Reserved Forest to a village community under Section 28 of the Indian Forest Act, 1927, what does it legally become?

(A) A Protected Forest
(B) An Unclassed Forest
(C) A Village Forest
(D) A Private Forest

74. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).

Assertion (A): Section 33 of the Indian Forest Act, 1927 lists penalties for offenses committed in a Protected Forest.

Reason (R): Protected forests lack any legal framework for prosecuting offenders, making Section 33 purely advisory.

In the light of the above statements, choose the correct answer from the options given below:

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

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75. Match the sections of the Indian Forest Act, 1927 given in List I with their corresponding provisions in List II:

List I: Sections

P. Section 4
Q. Section 20
R. Section 29
S. Section 35

List II: Provisions

1. Notification declaring forest reserved
2. Protection of forests at request of owners
3. Notification declaring intention to constitute reserved forest
4. Notification declaring protected forest

Which of the following options is correct?

(A) P-1, Q-3, R-2, S-4
(B) P-3, Q-4, R-1, S-2
(C) P-4, Q-1, R-3, S-2
(D) P-3, Q-1, R-4, S-2

76. In Uttar Pradesh, what is the principal cause of human-wildlife conflict around Reserved Forests in the Terai region?

(A) Rapid expansion of open-cast mining and quarrying activities in forest fringes.
(B) Proximity of sugarcane fields offering shelter to large carnivores.
(C) Heavy seasonal snowfall in high altitudes driving wild animals down to human habitats.
(D) Construction of large-scale commercial wind power projects across migration corridors.

77. Which of the following is NOT an objective of the Working Plan of a forest division?

(A) Systematic estimation of total growing stock and accurate annual timber yield calculation.
(B) Detailed scheduling and execution of mandatory annual silvicultural forest operations.
(C) Providing a roadmap for permanent conversion of forest to agricultural land.
(D) Ensuring the long-term sustained yield and supply of all essential forest produce items.

78. In the preparation of a Forest Working Plan, what does the term "Compartment" denote?

(A) A designated residential room allocated for officers inside a remote forest rest house.
(B) A temporary outdoor storage yard designated for keeping illegally seized timber logs.
(C) The official government inspection vehicle utilized daily by the Divisional Forest Officer.
(D) The smallest permanent unit of forest management with defined boundaries.

79. The Forest Rights Act, 2006 recognizes which of the following rights of forest dwellers?

(A) Right to hold and live in forest land for habitation or self-cultivation for livelihood.
(B) Unrestricted right to hunt wild animals across all forest zones for commercial trading purposes.
(C) Unlimited right to clear new virgin forest land for expanding commercial agricultural farming.
(D) Absolute right to extract major mineral resources from forest areas without environmental clearance.

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80. Consider the following statements regarding the Forest Rights Act (FRA), 2006:

I. "Other Traditional Forest Dwellers" must have resided in the forest for at least three generations prior to 2005.
II. One generation is defined as a period of 25 years.
III. The Gram Sabha is the authority to initiate the process for determining the nature and extent of Individual Forest Rights.
IV. Forest Rights once vested are alienable and can be sold to anyone.

Which of the above statement(s) is/are correct?

(A) I, II, and III
(B) I, II, and IV
(C) II, III, and IV
(D) I, III, and IV

81. Under the Indian Forest Act, 1927, transit of forest produce is regulated under which chapter?

(A) Chapter II (Section 20)
(B) Chapter VI (Section 41)
(C) Chapter IV (Section 30)
(D) Chapter VIII (Section 68)

82. Which of the following defines a "Transit Pass" (Ravanna) in the context of forest administration?

(A) A permit issued by officers for transporting forest produce.
(B) An official administrative document granting citizens free entry into any designated National Park.
(C) A statutory ownership certificate granting permanent land title rights to a tribal family.
(D) An official duty pass issued specifically to forest guards for authorized interstate official travel.

83. The practice of "Taungya" system, which was historically used in some Reserved Forests, involves:
(A) Employing heavy industrial machinery to systematically uproot and clear entire contiguous forest blocks.
(B) Enforcing a complete statutory prohibition against any human presence or activity inside the forest reserve.
(C) Allowing laborers to grow crops in new plantations until tree canopy closes.
(D) Granting exclusive rights for harvesting minor forest produce solely to registered urban commercial contractors.

84. Which state agency is responsible for organizing the "Van Mahotsav" (Forest Festival) across Uttar Pradesh annually in the first week of July?
(A) Uttar Pradesh State Pollution Control Board
(B) State Disaster Management Authority of UP
(C) Uttar Pradesh Tourism Development Board
(D) Uttar Pradesh Forest and Wildlife Department

85. Select the correct order of legal protection granted to forests in India, from the highest degree of restriction to the lowest:
(A) Protected Forest → Reserved Forest → Unclassed Forest
(B) Reserved Forest → Protected Forest → Unclassed Forest
(C) Unclassed Forest → Protected Forest → Reserved Forest
(D) Reserved Forest → Unclassed Forest → Protected Forest

86. What is the status of minor forest produce (MFP) under the Forest Rights Act, 2006?
(A) Only the State Forest Corporation is legally authorized to collect and market all types of MFP.
(B) Forest dwellers are granted ownership, access, use, and disposal rights over MFP.
(C) The collection of all minor forest produce is strictly banned by law to protect forest biodiversity.
(D) Minor forest produce can only be harvested after paying a mandatory 50% tax to the State Government.

87. Consider the following statements regarding illegal encroachment on forest lands:
I. GPS tracking and drone surveys are modern tools used by the UP Forest Department to monitor encroachments.
II. Section 61 of the Indian Forest Act allows immediate shoot-at-sight orders against encroachers.
III. Eviction from forest land often requires coordination between the Forest Department, Revenue Department, and Local Police.
Which of the above statement(s) is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

88. Under the Forest (Conservation) Rules, when a user agency deposits money for compensatory afforestation, what is the typical ratio of the area of non-forest land required for compensatory afforestation compared to the forest land diverted?
(A) Double area (2:1) on degraded forest land, or equal area (1:1) on non-forest land.
(B) Mandatory equal land area ratio (1:1) applied uniformly across all categories of diversion cases.
(C) Reduced half land area ratio (0.5:1) prescribed specifically to minimize project developer costs.
(D) Enhanced ten times land area ratio (10:1) enforced strictly to discourage any forest land diversion.

89. Which unique feature of geographic information systems (GIS) is primarily used in forest management for tracking forest fire incidents in real-time?
(A) Subsurface ground penetrating radar technology arrays.
(B) High-frequency seismic wave vibrational analysis equipment.
(C) Satellite imagery and thermal anomaly detection sensors.
(D) In-situ real-time soil moisture and humidity sensors.

90. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): The Forest (Conservation) Act, 1980 is a central legislation that overrides conflicting state laws regarding the diversion of forest land.
Reason (R): Forests fall under the Concurrent List of the Seventh Schedule of the Indian

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Constitution, allowing Central laws to prevail over State laws in case of repugnancy.
In the light of the above statements, choose the correct answer from the options given below:
(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

91. Which constitutional amendment transferred "Forests" from the State List to the Concurrent List?
(A) 44th Amendment Act, 1978
(B) 73rd Amendment Act, 1992
(C) 86th Amendment Act, 2002
(D) 42nd Amendment Act, 1976

92. Consider the following categories of forest offences under the Indian Forest Act, 1927:
I. Illicit felling of trees
II. Poaching of wildlife
III. Encroachment of forest land
IV. Setting fire to a Reserved Forest
Which of the above are explicitly dealt with under the penal provisions of the Indian Forest Act, 1927?
(A) I, II, and III
(B) I, III, and IV
(C) II, III, and IV
(D) I, II, III, and IV

93. A "Beat" in forest administration is:
(A) The supreme administrative unit of the forest hierarchy, roughly equivalent to an entire state.
(B) A specific type of illegal wire mesh snare deployed covertly by poachers in dense jungle.
(C) A subdivision of a Range managed by a Forester or Guard.
(D) The traditional seasonal migration track routinely followed by patrolling wild elephants.

94. Who among the following is the administrative head of the Forest Department in Uttar Pradesh?
(A) Chief Secretary to the State Government heading civil administration.
(B) Inspector General of Forests in the Union Ministry of Environment.
(C) Director General of Police heading the State Police Department.
(D) Principal Chief Conservator of Forests (PCCF).

95. The "Vriksharopan Mahabhiyan" in Uttar Pradesh set a target in recent years to plant a massive number of saplings. What was the approximate target for sapling plantation set by the UP government for the year 2023?
(A) 5 Crore
(B) 10 Crore
(C) 25 Crore
(D) 35 Crore

96. What is the fundamental role of a "Micro-Plan" in Joint Forest Management (JFM)?
(A) An official regulatory schedule that directly dictates the annual salaries and allowances of forest staff.
(B) A site-specific plan prepared jointly by JFMC and Forest Department for a village forest.
(C) An administrative document outlining the statewide commercial export policy for harvested timber logs.
(D) A mandatory annual financial audit document submitted directly to the state government treasury.

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97. In Uttar Pradesh, under which legal framework is the extraction of resin from pine trees in the hill regions regulated?
(A) Uttar Pradesh Timber and Other Forest Produce Transit Rules, 1978.
(B) UP Resin and Other Forest Produce (Regulation of Trade) Act, 1976.
(C) Indian Forest Act, 1927 provisions under Chapter II exclusively.
(D) The Scheduled Tribes and Other Traditional Forest Dwellers Act, 2006.

98. Which of the following is considered an "exception" to the ban on green felling in UP's Reserved Forests?
(A) Felling dead, dying, and diseased trees prescribed in the Working Plan.
(B) Meeting urgent commercial timber demand from private plywood manufacturing factories.
(C) Direct requests by local political leaders for road expansion without obtaining FCA clearance.
(D) Harvesting mature timber for private

household construction requirements of urban residents.

99. Match the administrative units of the Forest Department given in List I with the ranks of the officers heading them in List II**:**

List I: Administrative Unit

P. Forest Circle
Q. Forest Division
R. Forest Range
S. Forest Section

List II: Officer In-Charge

1. Forest Ranger
2. Forester
3. Conservator of Forests (CF)
4. Divisional Forest Officer (DFO/DCF)

Which of the following options is correct?

(A) P-4, Q-3, R-1, S-2
(B) P-3, Q-1, R-4, S-2
(C) P-3, Q-4, R-1, S-2
(D) P-1, Q-2, R-3, S-4

100. Consider the following statements regarding the powers of a Forest Officer under Section 66 of the Indian Forest Act, 1927:

I. Every Forest Officer and Police Officer shall prevent the commission of any forest-offence.
II. They have the power to interfere for the purpose of preventing such offences.
III. They can independently alter the boundaries of a Reserved Forest without state notification.

Which of the above statement(s) is/are correct?

(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

101. Which section of the Indian Forest Act, 1927 gives a Forest Officer or Police Officer the power to arrest a person without a warrant if there is reasonable suspicion of them committing a forest offence punishable with imprisonment for one month or upwards?

(A) Section 26
(B) Section 52
(C) Section 64
(D) Section 68

102. Under Section 68 of the Indian Forest Act, 1927, what power does a sufficiently empowered Forest Officer possess regarding compounding of offences?

(A) They possess full judicial authority to unconditionally pardon an offender for major non-forest crimes committed inside a forest.
(B) They can accept monetary compensation from a suspect to release seized property or person.
(C) They can directly try, convict, and sentence an offender to rigorous imprisonment for up to 5 years without trial.
(D) They can summarily confiscate private titled agricultural land adjacent to the forest border as a punitive penalty.

103. If a vehicle is seized by a Forest Officer because it was used to illegally transport timber from a Reserved Forest, which legal process determines whether the vehicle will be permanently confiscated by the State?

(A) A formal personal appeal submitted directly by the vehicle driver to the Divisional Forest Officer.
(B) A binding executive resolution passed by the local Gram Sabha under the Forest Rights Act, 2006.
(C) Statutory adjudication procedures conducted under the provisions of the Motor Vehicles Act, 1988.
(D) Statutory confiscation proceedings under the amended provisions of the Indian Forest Act.

104. What does the term "Silviculture" precisely mean in the context of forest management?

(A) Controlling the establishment, growth, composition, health, and quality of forests.
(B) The specialized scientific discipline of breeding endangered wild animals within captive zoo environments.
(C) The technical cartographic process of surveying and mapping forest boundaries using remote sensing satellites.
(D) The large-scale industrial chemical processing of harvested raw timber into commercial paper pulp.

105. Match the tree species commonly found in Uttar Pradesh given in List I with their primary utilities or features in List II**:**

List I: Tree Species

P. Khair (Acacia catechu)
Q. Sal (Shorea robusta)
R. Tendu (Diospyros melanoxylon)
S. Bamboo (Dendrocalamus spp.)

List II: Utility / Feature

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1. Leaves used for making bidis
2. Wood used for making Katha
3. Highly durable timber used for railway sleepers and construction
4. The 'poor man's timber', used extensively in rural housing and paper industry

Which of the following options is correct?
(A) P-3, Q-2, R-1, S-4
(B) P-2, Q-1, R-3, S-4
(C) P-2, Q-3, R-1, S-4
(D) P-1, Q-3, R-2, S-4

106. In the Terai arc landscape of Uttar Pradesh, which invasive weed is a major threat to the native grass and forest ecosystems, severely impacting herbivores?
(A) Lantana camara
(B) Eucalyptus globulus
(C) Mangifera indica
(D) Ficus benghalensis

107. The creation of a "Fire Line" in a Reserved Forest is an example of which type of management activity?
(A) Routine commercial exploitation of forest timber.
(B) Formal boundary dispute resolution procedure.
(C) Standard artificial afforestation technique.
(D) Preventive measure against forest fires.

108. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): The Uttar Pradesh Forest Corporation plays a major role in the auctioning and selling of seized illegal timber.
Reason (R): The Forest Department utilizes the Corporation's established depot and auction mechanisms for transparent disposal of forest produce.
In the light of the above statements, choose the correct answer from the options given below:
(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

109. Which of the following defines "Agroforestry"?
(A) Permanently converting entire private agricultural fields into dense state reserved forests.
(B) Cultivating commercial cash crops like sugarcane and wheat inside protected National Parks.
(C) Integrating trees and shrubs with crops or livestock on the same land unit.
(D) Practicing traditional shifting cultivation (slash and burn agriculture) in hilly tribal regions.

110. Consider the following statements about the Forest Advisory Committee (FAC):
I. It is constituted under the Forest (Conservation) Act, 1980.
II. Its mandate is to advise the Central Government on proposals for the diversion of forest land.
III. It consists of independent experts as well as government officials.
IV. Its recommendations are legally binding and cannot be rejected by the Ministry.
Which of the above statement(s) is/are correct?
(A) I, II, and III
(B) I, II, and IV
(C) II, III, and IV
(D) I, III, and IV

111. What is the primary focus of the "Sub-Mission on Agroforestry" (SMAF) operational in states like Uttar Pradesh?
(A) Encouraging farmers to plant trees alongside crops for income and carbon sequestration.
(B) Enforcing a complete statutory ban on all agricultural farming in areas adjoining public reserved forests.
(C) Distributing subsidized chemical fertilizers and synthetic pesticides directly to smallholder farmers.
(D) Promoting the widespread industrial use of heavy mechanized machinery in traditional agriculture.

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112. The Indian State of Forest Report (ISFR) is published biennially by which organization?
(A) Wildlife Institute of India (WII)
(B) Forest Survey of India (FSI)
(C) Botanical Survey of India (BSI)
(D) National Tiger Conservation Authority (NTCA)

113. Under the ISFR 2021, 'Tree Cover' is defined as tree patches outside the recorded forest area which are less than what size?

(A) Less than 1 hectare
(B) Less than 5 hectares
(C) Less than 10 hectares
(D) Less than 20 hectares

114. Consider the following statements regarding the rights of tribal communities in a Protected Area:
I. In a Wildlife Sanctuary, the District Collector determines the rights of people before final notification.
II. No new rights can be acquired once the initial intention to declare a Sanctuary is notified under Section 18 of WLPA.
III. FRA 2006 cannot be applied inside a National Park under any circumstances.
Which of the above statement(s) is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

115. Consider the following environmental laws in India:
1. Forest (Conservation) Act
2. Wildlife (Protection) Act
3. Indian Forest Act
4. Forest Rights Act
Which of the following represents the correct chronological order of their enactment?
(A) 3 - 2 - 1 - 4
(B) 3 - 1 - 2 - 4
(C) 2 - 3 - 1 - 4
(D) 1 - 2 - 3 - 4

116. A primary objective of digital forest management tools like the 'e-Forest' platform in Uttar Pradesh is to:
(A) Completely replacing physical ground patrolling carried out by beat forest guards.
(B) Fully automating the commercial felling and timber logging operations using robotics.
(C) Allowing private commercial corporations to permanently acquire and own state forest databases.
(D) Ensuring speed and transparency in issuing transit passes and nursery management.

117. What is the significance of the "Kukrail Reserve Forest" located in Lucknow, Uttar Pradesh?
(A) It is formally designated as the largest contiguous tiger reserve landscape in the entire state.
(B) It represents the single exclusive habitat location in UP where wild elephant herds are found.
(C) It is a center for breeding Ghariyals and serves as a major urban forest.
(D) It is classified as an unclassed forest tract completely devoid of any legal environmental protection.

118. The "Vindhya" forest region of Uttar Pradesh (Mirzapur, Sonbhadra) is predominantly characterized by which type of forest?
(A) Tropical Moist Deciduous Forests
(B) Tropical Dry Deciduous Forests
(C) Alpine Scrub Forests
(D) Mangrove Forests

119. In the context of forestry, what does "rotation period" mean?
(A) The total duration of time required for a beat forest guard to complete one full ground patrol cycle.
(B) The routine seasonal migration shift of wild herbivore populations moving from alluvial plains to hills.
(C) The statutory administrative transfer policy tenure fixed for posted territorial forest officers.
(D) The planned years between regenerating a forest crop and its final felling.

120. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): The Forest (Conservation) Act, 1980 is not applicable to the clearing of naturally grown trees in unclassed forests for cultivation.
Reason (R): The Supreme Court clarified in the Godavarman case that the term "forest" must be understood according to its dictionary meaning, covering all statutorily recognized forests, whether designated as reserved, protected or otherwise.
In the light of the above statements, choose the correct answer from the options given below:
(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

121. Under Section 2 of the Forest (Conservation) Act, 1980, which of the following is considered

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a forestry activity and NOT a "non-forest purpose"?
(A) Commercial establishment and operation of a public zoo.
(B) Agricultural cultivation and harvesting of commercial tea plantations.
(C) Construction of small wildlife waterholes or check dams.
(D) Commercial extraction and mining of minor mineral deposits.

122. Under the Indian Forest Act, 1927, what is the meaning of "Forest-produce"?
(A) Timber, charcoal, resin, lac, bark, and specified items whether from a forest or not.
(B) Exclusively commercial timber logs, firewood, and processed charcoal products.
(C) Products and items found exclusively within the boundaries of a Reserved Forest.
(D) Wild animals and birds hunted exclusively for commercial or personal meat consumption.

123. If a person finds a piece of unmarked timber floating in a river, under Chapter VIII of the Indian Forest Act, 1927, to whom does this timber legally belong until an ownership claim is proven?
(A) The person who found it
(B) The local Gram Panchayat
(C) The Central Water Commission
(D) The State Government

124. Which Chapter of the Indian Forest Act, 1927 deals specifically with the collection of drift and stranded timber?
(A) Chapter III
(B) Chapter V
(C) Chapter VIII
(D) Chapter IX

125. The establishment of "Smriti Vans" (Memorial Forests) by the UP Government is an initiative primarily meant to:
(A) Grow commercial timber specifically earmarked for constructing government office buildings.
(B) Create designated burial grounds and graveyards inside state-owned public forest lands.
(C) Encourage tree planting by dedicating trees in memory of loved ones.
(D) Compensate for large numbers of mature trees felled during major highway widening projects.

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126. Match the schemes/initiatives given in List I with their primary objectives in List II**:**
List I: Schemes / Initiatives
P. Nagar Van Yojana
Q. School Nursery Yojana
R. CAMPA
S. Project Tiger
List II: Primary Objectives
1. To fund compensatory afforestation activities
2. To create green spaces in urban areas
3. To protect the apex predator and its habitat
4. To inculcate the habit of planting trees among students
Which of the following options is correct?
(A) P-1, Q-2, R-3, S-4
(B) P-4, Q-2, R-1, S-3
(C) P-2, Q-1, R-4, S-3
(D) P-2, Q-4, R-1, S-3

127. Which of the following acts provides the legal framework for the protection of plant and animal species and forms the basis for establishing National Parks and Wildlife Sanctuaries?
(A) Wildlife (Protection) Act, 1972
(B) Indian Forest Act, 1927
(C) Forest (Conservation) Act, 1980
(D) Environment (Protection) Act, 1986

128. In Uttar Pradesh, Katarniaghat Wildlife Sanctuary, which contains significant stretches of Reserved Forests, is a crucial part of which larger conservation landscape?
(A) Pilibhit Tiger Reserve
(B) Dudhwa Tiger Reserve
(C) Amangarh Tiger Reserve
(D) Ranipur Tiger Reserve

129. The concept of a "Biosphere Reserve" differs from a typical Reserved Forest primarily because a Biosphere Reserve:
(A) Is designated and maintained exclusively for large-scale commercial timber extraction.
(B) Employs core, buffer, and transition zones for conservation and sustainable use.
(C) Completely excludes and prohibits any form of scientific research or ecological monitoring.
(D) Is a legal territory that does not enforce any statutory wildlife protection regulations.

130. Consider the following statements regarding the Forest Settlement process under the Indian Forest Act, 1927:
I. The Forest Settlement Officer evaluates claims of rights to pasture and forest

produce.

II. The FSO can acquire land over which rights are claimed, under the Land Acquisition Act.

III. The FSO does not have the authority to alter the limits of the proposed forest to exclude claimed land.

Which of the above statement(s) is/are correct?

(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

131. Consider the following statements about Private Forests in Uttar Pradesh:

I. Private forests can be regulated by the State Government under Chapter V of the IFA 1927.

II. Felling of trees on private lands in UP is governed by the UP Protection of Trees Act, 1976.

III. No permission is ever required to fell any tree grown on one's own private agricultural land.

IV. Certain species of trees on private land are exempt from felling restrictions to encourage agroforestry.

Which of the above statement(s) is/are correct?

(A) I, II, and III
(B) I, II, and IV
(C) II, III, and IV
(D) I, III, and IV

132. What is the role of a "Nodal Officer" appointed under the Forest (Conservation) Act, 1980 in a state?

(A) To single-handedly approve or reject all major forest land diversion proposals in the state.
(B) To directly lead field operations to arrest wildlife poachers across protected tiger reserves.
(C) To organize, supervise, and conduct public auctions for legally seized timber stock.
(D) To receive, process, and forward forest diversion proposals to MoEFCC.

133. The Forest Rights Act, 2006 recognizes "Community Tenures of Habitat" primarily for which group of people?

(A) Licensed urban real estate developers seeking land for commercial housing projects.
(B) Private commercial plantation companies engaged in exotic monoculture forestry.
(C) Particularly Vulnerable Tribal Groups (PVTGs) and Pre-agricultural Communities.
(D) Association of retired senior state forest department officials and administrative staff.

134. Which section of the Forest Rights Act, 2006 acts as an overarching clause stating that the rights recognized under the Act are heritable but NOT alienable or transferable?

(A) Section 3
(B) Section 4(4)
(C) Section 6
(D) Section 11

135. Match the forestry practices given in List I with their descriptions in List II**:**

List I: Forestry Practice

P. Coppicing
Q. Thinning
R. Clear Felling
S. Selective Logging

List II: Description

1. Removing a proportion of trees in a young stand to reduce competition.
2. Cutting a tree near the base to encourage the growth of multiple new shoots.
3. Harvesting only specific trees of a certain species or size.
4. Removing all trees in a given area at the same time.

Which of the following options is correct?

(A) P-1, Q-2, R-3, S-4
(B) P-4, Q-3, R-1, S-2
(C) P-2, Q-4, R-1, S-3
(D) P-2, Q-1, R-4, S-3

136. Which organization acts as the primary agency for implementing eco-tourism policies within the forest areas of Uttar Pradesh?

(A) UP Forest Corporation in coordination with the Forest Department.
(B) Uttar Pradesh Tourism Development Corporation acting as the sole state tourism body.
(C) Union Ministry of Culture supervising national cultural heritage sites and forest monuments.
(D) Uttar Pradesh State Road Transport Corporation managing public transit infrastructure.

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137. Which district in Uttar Pradesh is home to the Ranipur Tiger Reserve, formally notified to enhance wildlife and forest conservation?
(A) Lalitpur
(B) Banda
(C) Chitrakoot
(D) Mahoba

138. The state tree of Uttar Pradesh, often planted heavily in the state's afforestation drives, is:
(A) Ashoka (Saraca asoca)
(B) Banyan (Ficus benghalensis)
(C) Sal (Shorea robusta)
(D) Palash (Butea monosperma)

139. In the context of UP Forest policies, what does "Catchment Area Treatment" (CAT) plan involve?
(A) Treating injured or diseased wild animals in specialized state veterinary wildlife hospitals.
(B) Constructing large water purification plants to supply clean drinking water to urban cities.
(C) Eradicating all trees and vegetation around dam reservoirs to reduce water transpiration loss.
(D) Afforestation, soil, and moisture conservation in watersheds to prevent siltation.

140. Consider the following statements about the structure of a Joint Forest Management Committee (JFMC):
I. The JFMC usually comprises a General Body and an Executive Committee.
II. All adult members of the village are typically members of the General Body.
III. The local Forest Guard or Forester often acts as the ex-officio Member Secretary of the Executive Committee.
IV. JFMCs are entirely funded and operated by private NGOs without government oversight.
Which of the above statement(s) is/are correct?
(A) I, II, and III
(B) I, II, and IV
(C) II, III, and IV
(D) I, III, and IV

141. The legal tool "Letter of Intent" (LoI) in the context of forest land diversion refers to:
(A) The statutory application form submitted by a private farmer seeking a timber transit pass.
(B) The final executive order issued by the state allowing immediate tree cutting and clearance.
(C) Stage-I approval granted by MoEFCC stipulating conditions for final diversion.
(D) A formal legal eviction notice served to local villagers directing them to vacate forest land.

142. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): Van Panchayats in Uttarakhand are unique because they are democratic village institutions managing local forests.
Reason (R): They were created strictly under the provisions of the Forest Rights Act, 2006.
In the light of the above statements, choose the correct answer from the options given below:
(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

143. Which of the following represents an "in-situ" conservation method within the framework of Reserved Forests?
(A) Declaring part of the forest a Wildlife Sanctuary.
(B) Establishing an ex-situ artificial botanical garden.
(C) Setting up a low-temperature seed storage bank.
(D) Breeding endangered captive tigers inside a zoo facility.

144. What is the fundamental difference between 'Afforestation' and 'Reforestation'?
(A) Afforestation denotes tree planting undertaken strictly by government agencies, while Reforestation is done by private citizens.
(B) Afforestation plants trees on non-forest land; Reforestation replants cleared forest areas.
(C) Afforestation relies exclusively on native indigenous species, whereas Reforestation uses imported exotic tree species.
(D) There is no conceptual or legal difference between the terms, as both are fully interchangeable under the Indian Forest Act, 1927.

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145. A major function of the Uttar Pradesh Forest Corporation is the scientific harvesting of timber. Why is "scientific harvesting" preferred over natural decay in managed production forests?
(A) It aims to systematically clear managed timber forests to enable long-term commercial urban development projects.
(B) It generates revenue, removes over-mature trees, and enables regeneration of young stock.
(C) Natural decay of dead timber logs causes severe environmental pollution and heavy soil degradation in the forest.
(D) Leaving dead trees to rot in managed production forests explicitly violates the statutory Wildlife Protection Act.

146. Which of the following is considered a "Minor Forest Produce" (MFP) under the Forest Rights Act, 2006?
(A) Tendu leaves
(B) Timber (Timber logs)
(C) Coal
(D) Sand

147. Under the Indian Forest Act, 1927, who has the authority to make rules for the management of a Village Forest?
(A) The Central Government
(B) The Supreme Court of India
(C) The State Government
(D) The local Member of Legislative Assembly (MLA)

148. Which provision protects Forest Officers from legal prosecution for acts done in "good faith" while executing their duties under the Indian Forest Act, 1927?
(A) Section 4
(B) Section 26
(C) Section 74
(D) Section 82

149. Which of the following represents the correct order of stages in establishing a Reserved Forest under the Indian Forest Act, 1927?
(A) Notification under Section 4 → Inquiry by Forest Settlement Officer → Resolution of claims → Final notification under Section 20
(B) Final notification under Section 20 → Inquiry by Forest Settlement Officer → Notification under Section 4 → Resolution of claims
(C) Inquiry by Forest Settlement Officer → Notification under Section 4 → Final notification under Section 20 → Resolution of claims
(D) Notification under Section 4 → Final notification under Section 20 → Inquiry by Forest Settlement Officer → Resolution of claims

150. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): The State Government cannot easily de-reserve a Reserved Forest today compared to the period before 1980.
Reason (R): The Forest (Conservation) Act, 1980 mandates prior approval of the Central Government before any Reserved Forest can be de-reserved.
In the light of the above statements, choose the correct answer from the options given below:
(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

151. What is the penalty for counterfeiting or defacing marks on trees and timber under Section 63 of the Indian Forest Act, 1927?
(A) A nominal monetary fine only, capped strictly at Rs. 50.
(B) Imprisonment up to two years, or fine, or both.
(C) Capital punishment administered by a special forest tribunal.
(D) Permanent statutory confiscation of all personal property owned.

152. To resolve a dispute regarding the boundaries of a forest block with adjacent revenue land, the Forest Department conducts a joint survey with which department?
(A) Revenue Department.
(B) State Police Department.
(C) Public Works Department.
(D) State Irrigation Department.

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153. What role does the "Gram Sabha" play under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006?
(A) It functions as the supreme final appellate

authority empowered to reject invalid land claims.
(B) It functions as the primary statutory policing authority empowered to arrest illegal poachers.
(C) It initiates the process for determining individual or community forest rights.
(D) It issues legal timber transit passes required for all commercial timber logging operations.

154. If an industrial project requires both forest land and environmental clearance, the forest clearance must be obtained under which Act?
(A) Forest (Conservation) Act, 1980
(B) Air (Prevention and Control of Pollution) Act, 1981
(C) Environment (Protection) Act, 1986
(D) Biological Diversity Act, 2002

155. Consider the following statements about the India State of Forest Report (ISFR):
I. It categorizes forests purely based on legal ownership rather than canopy density.
II. It utilizes remote sensing satellite data (like Resourcesat LISS III) for mapping.
III. It provides estimates of both forest cover and tree cover in the state.
Which of the above statement(s) is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

156. In the administrative setup of the Uttar Pradesh Forest Department, a "Conservator of Forests" (CF) is generally in charge of which territorial unit?
(A) A Forest Section
(B) A Forest Circle
(C) A Forest Beat
(D) A Forest Division

157. Which of the following is a common method employed in Uttar Pradesh to combat soil erosion and stabilize ravines (e.g., in the Chambal and Yamuna catchment areas)?
(A) Intensive mechanized commercial crop farming across degraded ravine landscapes.
(B) Systematic clear felling and removal of all existing native ground vegetation.
(C) Aerial seeding and afforestation with hardy species like Babool.
(D) Construction of heavy concrete highways and industrial structures across the ravines.

158. The "Pilibhit Tiger Reserve" in Uttar Pradesh was primarily carved out from which legal category of forests?
(A) Unclassed Forests managed by regional local bodies.
(B) Privately held commercial agricultural crop lands.
(C) Urban municipal parks managed by local city councils.
(D) Reserved Forests of the Pilibhit Division.

159. What does the term "Felling Cycle" refer to in a Forest Working Plan?
(A) The time elapsing between two successive main fellings on the same area.
(B) The standard official bicycle provided to beat forest guards for daily routine patrolling.
(C) The specific annual meteorological season when deciduous trees shed their autumn leaves.
(D) The complete biological life cycle and metamorphosis of a wood-boring forest insect species.

160. Under the Forest (Conservation) Act, 1980, the establishment of wind energy plants on forest land is:
(A) Completely prohibited under all circumstances regardless of public project necessity.
(B) A non-forest activity requiring prior approval and compensatory afforestation.
(C) Permitted freely without restrictions because wind power is a clean green energy source.
(D) Exempted from all statutory clearance processes provided the project is built by the State.

161. Match the legal terms given in List I with their correct definitions in forestry context in List II**:**
List I: Legal Term
P. Usufruct
Q. Seizure
R. Compounding
S. Confiscation
List II: Definition
1. Taking possession of items suspected to be involved in a forest offence.
2. The legal transfer of ownership of seized property to the State.
3. The right to enjoy the use and advantages of another's property short of destruction (e.g., collecting fallen branches).
4. Accepting compensation from a suspected

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offender to drop charges.

Which of the following options is correct?

(A) P-1, Q-2, R-3, S-4
(B) P-3, Q-1, R-4, S-2
(C) P-4, Q-3, R-2, S-1
(D) P-3, Q-4, R-1, S-2

162. Why is "Lantana" often subject to systematic eradication campaigns in UP's Protected and Reserved Forests?

(A) Toxic invasive weed suppressing native fodder and degrading tiger habitat.
(B) Plant species highly prized and extensively harvested by illegal wildlife poachers.
(C) Environmental hazard that causes extreme soil erosion along river catchments.
(D) Commercial tree whose timber is illegally harvested and exported for high prices.

163. The legal boundary of a Reserved Forest is recorded in standard topographical maps typically maintained by:

(A) The Geological Survey of India
(B) The Archaeological Survey of India
(C) The Survey of India
(D) The Indian Meteorological Department

164. What is the fundamental objective of the "National Afforestation Programme" (NAP) implemented via the Forest Development Agencies (FDAs)?

(A) Total privatization and commercial leasing of national parks to foreign private corporate investors.
(B) Complete eradication and relocation of wild elephants from all surrounding agricultural farming regions.
(C) Conversion and infrastructural modernization of tribal forest villages into urban smart cities.
(D) Ecological restoration of degraded forests and fringe community development via JFM.

165. According to the UP Forest Corporation's operational procedures, when a timber lot is ready for auction, it is primarily categorized and sold based on:

(A) The religious significance of the trees.
(B) The distance of the tree from the nearest city.
(C) Species, length, and girth classes.
(D) The age of the forest guard who marked the tree.

166. Under the Forest Rights Act, 2006, the "District Level Committee" (DLC) which gives the final approval for forest rights records is generally headed by:

(A) The Divisional Forest Officer of the region
(B) The District Magistrate / District Collector
(C) The elected Member of Parliament for the district
(D) The Zila Panchayat Adhyaksha of the district

167. Which of the following is NOT an essential component of a Forest Working Plan?

(A) Assessment of total growing stock in division.
(B) Prescribing appropriate silvicultural systems.
(C) Setting target quotas for artificial regeneration.
(D) Income tax assessment of staff.

168. Consider the following statements concerning forest fire management:

I. Controlled burning is a technique used to reduce combustible dry fuel on the forest floor.
II. Fire lines are clearings maintained completely free of vegetation to halt surface fires.
III. Forest fires in UP's deciduous forests are predominantly natural and rarely caused by human activity.
IV. The Forest Survey of India provides early warning alerts for forest fires using satellite data.

Which of the above statement(s) is/are correct?

(A) I, II, and III
(B) I, II, and IV
(C) II, III, and IV
(D) I, III, and IV

169. What is a "Nistar" right in historical forest management context in India?

(A) Absolute legal right granted to elite citizens to shoot wildlife inside forest reserves for sport.
(B) The sovereign claim of the British Crown over all commercial forest timber resources across India.
(C) Concessional rights granted to villagers to meet domestic needs for timber, fuel, and fodder.
(D) The statutory toll tax levied by the state treasury on all forms of forest produce transportation.

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170. Under the CAMPA framework, the funds collected for Compensatory Afforestation can be legitimately utilized for which of the following activities?

(A) Artificial regeneration plantations, fire prevention, and wildlife protection.

(B) Purchasing official luxury motor vehicles for senior state administrative bureaucrats.

(C) Constructing non-forestry commercial infrastructure such as urban shopping malls.

(D) Direct financial subsidization of commercial agricultural loans for local farmers.

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ANSWERS

1. (A) Section 3
Section 3 of the Indian Forest Act, 1927 grants the State Government explicit statutory power to constitute any forest-land or waste-land as a Reserved Forest. This power applies to lands owned by the government or over which it holds proprietary rights. Initiating this legal provision begins the formal statutory procedure for establishing reserved forest areas.

2. (A) In a Reserved Forest, all activities are prohibited unless permitted, while in a Protected Forest, activities are permitted unless prohibited.
Reserved Forests operate under a restrictive legal regime where all human activities are strictly prohibited unless explicitly allowed by law or formal permission. Conversely, Protected Forests operate under a permissive legal framework where public activities and rights remain generally allowed unless specifically prohibited by government notification. This distinction dictates how rights and public access are managed.

3. (C) Reserved Forest
Section 28 of the Indian Forest Act, 1927 authorizes the State Government to assign its proprietary rights over any land constituted as a Reserved Forest to a village community. Once assigned, such forest areas are designated as Village Forests. The government retains authority to frame regulations governing the protection, management, and resource utilization of these areas.

4. (A) Indian Forest Act, 1865
The Indian Forest Act of 1865 represented the colonial government's initial statutory attempt to regulate forests in India. This legislation formally asserted State monopoly over forest resources, empowering the administration to declare government lands as reserved forests. It established early administrative framework controls, though it lacked detailed classification systems subsequently introduced by later statutory acts.

5. (C) Reserved, Protected, and Village Forests
The Indian Forest Act of 1878 introduced a comprehensive legal classification system dividing forests into Reserved Forests, Protected Forests, and Village Forests. Reserved Forests provided maximum statutory protection and government control, Protected Forests regulated local rights while keeping land usable, and Village Forests catered directly to community needs under state rules, laying modern forestry foundations.

6. (B) Forest Settlement Officer
The Forest Settlement Officer is statutorily appointed by the State Government following a preliminary notification to declare a Reserved Forest. This official functions as an independent quasi-judicial authority responsible for investigating, determining, and settling all public or private rights, claims, and easements existing over the proposed forest land prior to final notification issuance.

7. (D) No new right shall be acquired in or over the land comprised in the notification.
Issuing a notification under Section 4 of the Indian Forest Act, 1927 legalizes the state's intention to create a Reserved Forest. Once published, a statutory restriction takes immediate effect, preventing any person from acquiring new rights over the designated land through grant, lease, or transaction, except by succession or under explicit government authorization.

8. (A) The publication of a final notification declaring the forest reserved from a specified date.
Section 20 of the Indian Forest Act, 1927 represents the final statutory stage in creating a Reserved Forest. After all land claims, rights, and appeals are thoroughly investigated and settled by the Forest Settlement Officer, the State Government publishes a final notification formally specifying the boundaries and exact date from which reservation takes effect.

9. (B) Section 26
Section 26 of the Indian Forest Act, 1927 defines statutory offences and outlines corresponding penal consequences for unlawful activities

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committed within Reserved Forests. Forbidden acts include setting fires, illegal tree felling, unauthorized grazing, quarrying, and trespassing. Violators face penal sanctions involving imprisonment, monetary fines, or both, ensuring legal enforcement and ecosystem conservation.

10. (A) I and II only
A Forest Settlement Officer holds powers equivalent to a Civil Court for trying land claims and can commute rights to pasture or forest produce through monetary compensation or land grants. However, the officer is typically a revenue official appointed by the State Government rather than a senior Central-appointed Indian Forest Service officer.

11. (D) It must be land where the Government holds proprietary rights and is not a Reserved Forest.
Section 29 of the Indian Forest Act, 1927 empowers State Governments to declare state-owned forest-land or waste-land as Protected Forest. A fundamental statutory prerequisite is that the land must be property over which the government holds proprietary rights or entitlement, and it must not already be included within a notified Reserved Forest.

12. (A) Section 30
Section 30 of the Indian Forest Act, 1927 authorizes the State Government to issue notifications declaring specific tree classes as reserved within Protected Forests. Additionally, this provision empowers authorities to close portions of protected forests for specified periods to enable natural regeneration, while prohibiting stone quarrying, burning, or harvesting of forest produce.

13. (C) They are lands recorded as forest but not constituted as Reserved or Protected Forests.
Unclassed Forests comprise government-recorded forest lands that have not been formally declared as either Reserved Forests or Protected Forests under statutory forest legislation. Ownership may rest with government entities, tribal bodies, or private landholders. They generally possess flexible administrative controls and lower legal protection levels compared to formally notified statutory forest categories.

14. (B) Three months from the date of the Section 4 proclamation
Following the publication of a proclamation under Section 4 regarding the intent to constitute a Reserved Forest, affected individuals must submit claims. Section 6 specifies that claimants must present written or oral claims regarding rights over land or forest produce to the Forest Settlement Officer within a minimum period of three months.

15. (A) P-4, Q-1, R-3, S-2
The Indian Forest Act, 1927 categorizes statutory forestry provisions across structured legal chapters. Chapter II governs Reserved Forests, Chapter III deals with Village Forests, Chapter IV regulates Protected Forests, and Chapter V addresses control over non-government forests and lands. Each chapter establishes specific administrative procedures, rights, restrictions, and regulatory powers for land management.

16. (B) To check deforestation by restricting the use of forest land for non-forest purposes.
The Forest (Conservation) Act, 1980 was enacted as a critical environmental measure to prevent rampant deforestation and preserve ecological balance. Its primary objective is restricting the diversion and utilization of forest lands for non-forestry activities by establishing mandatory central regulatory mechanisms and requiring prior approval from the Central Government for any land diversion.

17. (B) The Central Government
Section 2 of the Forest (Conservation) Act, 1980 mandates that no State Government or administrative authority can issue orders to de-reserve any Reserved Forest without obtaining prior approval from the Central Government. This statutory requirement prevents arbitrary loss of forest land and ensures national oversight regarding ecological preservation and sustainable environmental management.

18. (A) Cultivation of tea, coffee, spices, rubber, or palms
The Forest (Conservation) Act, 1980 explicitly defines "non-forest purpose" as the clearing or cultivation of forest land for commercial agricultural crops such as tea, coffee, spices, rubber, palms, or medicinal plants. Conversely, essential management activities like establishing

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check-posts, fire lines, bridges, and conservation structures are classified as forestry operations.

19. (B) 6.88%
According to the India State of Forest Report (ISFR) 2021, the Recorded Forest Area (RFA) in Uttar Pradesh stands at approximately 16,582 square kilometers. This recorded area constitutes nearly 6.88% of the state's total geographical area of 240,928 square kilometers, representing government-maintained administrative records covering reserved, protected, and unclassed forest land categories.

20. (A) I, II, and III
Sonbhadra district possesses the largest forest cover in Uttar Pradesh, while Sant Ravidas Nagar (Bhadohi) recorded the lowest. Dense forest concentrations are predominantly found in the Terai and Bhabar regions. Furthermore, open forests cover a significantly larger geographical percentage of UP's total forest area compared to very dense forest canopy cover.

21. (C) Lakhimpur Kheri
In Uttar Pradesh, Sonbhadra district holds the highest forest cover area in absolute terms. Lakhimpur Kheri ranks second among all districts, featuring extensive tropical moist deciduous forests, dense grasslands, and protected ecosystems across the Terai belt. Mirzapur and Chandauli also contain substantial forest cover but follow Lakhimpur Kheri in size.

22. (C) Around 72.79%
Within the total Recorded Forest Area (RFA) of Uttar Pradesh, Reserved Forests constitute the overwhelming majority, accounting for approximately 72.79%. Protected Forests make up around 6.98%, while Unclassed Forests cover about 20.23%. This high proportion of Reserved Forests reflects strong statutory protection and direct state administration over forest lands.

23. (D) Forest Cover measures canopy density of 10% and above via satellite, while RFA denotes statutory forest area in government records.
Recorded Forest Area (RFA) refers strictly to lands legalised or documented as forests in government revenue or forest records, irrespective of actual tree existence. In contrast, Forest Cover refers to all land patches exceeding one hectare with tree canopy density of 10 percent or higher, detected via remote sensing satellite technology regardless of ownership.

24. (A) December 13, 2005
The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 establishes December 13, 2005, as the statutory cut-off date. To qualify for individual or community forest rights under this law, claimants must demonstrate occupation or dependence on forest land for bona fide livelihood needs prior to this date.

25. (B) Gram Sabha → Sub-Divisional Level Committee → District Level Committee
Under the Forest Rights Act, 2006, the claim determination process follows a structured three-tier statutory hierarchy starting at the base level with the Gram Sabha. Claims recommended by the Gram Sabha pass to the Sub-Divisional Level Committee for examination, before final approval and record preparation by the District Level Committee.

26. (B) 4 hectares
The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 stipulates that individual forest rights granted for habitation or self-cultivation shall be restricted to the area actually occupied, subject to a statutory maximum ceiling limit of 4 hectares per nuclear family, without conferring land alienation rights.

27. (D) Customary common forest land within traditional village boundaries to which communities have access.
Community Forest Resource under the Forest Rights Act, 2006 refers to customary forest land within traditional village boundaries or seasonal use areas to which communities have had sustainable access. This includes protected forests, sanctuaries, and national parks where communities traditionally exercised access to conserve, protect, manage, and utilize forest resources.

28. (B) The Community Forest Resource Management Committee set up by the Gram Sabha.
Under the Forest Rights Act Rules, the Gram Sabha constitutes a specialized Community Forest Resource Management Committee. This body is empowered to prepare sustainable

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conservation and management plans for community forest resources, integrate them into local development schemes, and protect forest biodiversity, wildlife, and catchments against harmful commercial activities.

29. (C) A written scheme for the scientific management of a specific forest area over a 10-year period.
A Working Plan is the fundamental legal and technical instrument for managing a forest division scientifically. It details standing volume assessments, yields, silvicultural prescriptions, regeneration programs, and protection strategies designed for a specific ten-year operational period. It ensures sustained resource availability while maintaining ecological balance in statutory forest areas.

30. (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
Commercial felling requires a mandatory approved Working Plan to ensure sustainable yield. The Supreme Court's landmark ruling in T.N. Godavarman Thirumulpad v. Union of India (1996) made approved Working Plans mandatory across India, prohibiting unscientific tree felling without prior MoEFCC sanction. Thus, both statements are true and causally related.

31. (B) 10 years
According to the National Working Plan Code issued by the Ministry of Environment, Forest and Climate Change, a standard Forest Working Plan is formulated to cover a operational period of 10 years. After completing this operational cycle, the plan undergoes detailed field revision, enumeration, and formal renewal for another decade.

32. (B) The Regional Office of the Ministry of Environment, Forest and Climate Change.
Forest Working Plans prepared by State Forest Departments require formal technical evaluation and statutory approval from the Regional Office of the Ministry of Environment, Forest and Climate Change. This centralized oversight ensures uniform application of national forest conservation guidelines, sustainable silvicultural extraction principles, and ecological protection standards nationwide.

33. (B) The Forest Department and the local community
Joint Forest Management is a collaborative management framework establishing a formal partnership between state Forest Departments and local village communities. Local institutions, such as Joint Forest Management Committees, participate in protecting and regenerating degraded public forests in exchange for specified non-timber forest produce rights and shared timber revenue benefits.

34. (A) Forest Development Agency
In Joint Forest Management, FDA stands for Forest Development Agency. Functioning as a registered society at the forest division level, the FDA serves as an intermediary body connecting local Joint Forest Management Committees with government funding channels. It manages financial resources for community afforestation and eco-development initiatives.

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35. (C) The hill districts of Uttarakhand.
Van Panchayats represent a historic community-based forest management system unique to the hill districts of Uttarakhand. Formed to resolve grievances regarding British forest restrictions, these elected local bodies legally manage designated community forest lands, regulate grazing, collect minor forest produce, and enforce local conservation practices independently of state authority.

36. (C) 1931
Following public resistance against British forest enclosures in the Kumaon region, the colonial government established the Kumaon Forest Grievances Committee. Based on its recommendations, the statutory Van Panchayat Rules were enacted in 1931 under the Scheduled Districts Act, formally empowering local village communities to manage surrounding forest lands.

37. (C) To prevent storm damage, preserve ridge soil, and maintain spring water supply.
Chapter V of the Indian Forest Act, 1927 allows State Governments to regulate or prohibit clearing, grazing, or timber felling in private forests. These interventions are justified on environmental grounds, specifically preventing land degradation, protecting watersheds, preserving steep ridge soil, controlling erosion, and maintaining natural spring water supplies.

38. (B) It can assume management of the forest, treating it as a Reserved Forest under compensation rules.
Under Section 36 of the Indian Forest Act, 1927, if a private forest owner neglects or refuses to comply with conservation regulations issued under Chapter V, the State Government may assume temporary or permanent management of the forest, applying statutory rules governing Reserved Forests while providing financial compensation to the owner.

39. (D) Municipal Commercial Forest
Indian forest law recognizes Reserved Forests, Protected Forests, and Unclassed Forests as legal categories based on statutory notifications under the Indian Forest Act, 1927. Municipal Commercial Forest is not a recognized legal forest classification under national statutory schemes, serving merely as a descriptive municipal urban land planning label.

40. (B) II and III only
Unclassed Forests encompass all recorded forest lands not formally notified as Reserved or Protected Forests under statutory provisions. They can belong to government entities, private individuals, or public corporations, and typically receive the lowest level of legal protection under forest law, whereas Reserved Forests receive maximum legal safeguards.

41. (C) 33% overall, with 20% in plains and 66% in hills
The National Forest Policy of 1988 establishes the national goal of maintaining a minimum of one-third (33%) of India's total land area under forest or tree cover. To ensure ecological stability and prevent soil erosion, it recommends maintaining two-thirds (66%) forest cover in hilly regions and 20% in plains areas.

42. (A) Environmental stability and ecological balance over economic benefit.
The National Forest Policy of 1988 marked a major policy shift from commercial timber extraction toward environmental conservation. It established ecological balance, environmental stability, ecosystem restoration, and meeting basic local community fuel and fodder needs as primary objectives, subordinating direct state revenue generation and commercial economic exploitation of public forests.

43. (D) Promoting Agroforestry and Social Forestry among farmers.
Under the Uttar Pradesh State Forest Policy, promoting Agroforestry and Social Forestry serves as the primary mechanism for expanding tree cover outside recorded forest boundaries. By encouraging private farmers, rural communities, and institutions to integrate trees with agriculture, the state successfully increases green canopy while generating supplemental farm income.

44. (B) To plant trees on non-forest land in lieu of forest land diverted for non-forest use.
Compensatory Afforestation under the Forest (Conservation) Act, 1980 mandates that whenever forest land is diverted for non-forestry development projects, equivalent non-forest land must be identified and afforested at project cost. This mitigates environmental loss, preserves long-term canopy cover, and balances industrial development with national ecological sustainability.

45. (C) P-3, Q-1, R-4, S-2
Afforestation involves establishing trees on non-forested land. Reforestation entails replanting areas where forest canopy was recently removed. Deforestation refers to the permanent conversion of forested tracts to non-forest usages. Agroforestry combines agriculture with tree growing on the same land unit to promote sustainable integrated land management.

46. (B) 10%
Under the Compensatory Afforestation Fund Act, 2016, funds collected from user agencies for compensatory afforestation, net present value, and related charges are distributed systematically. Ten percent of the total collected funds is retained in the National Compensatory Afforestation Fund, while ninety percent is transferred directly to the respective State Funds.

47. (A) e-Green Watch (web-based GIS portal)
The e-Green Watch portal is an integrated web-based GIS platform developed by the Ministry of Environment, Forest and Climate Change. It enables transparent tracking, monitoring, and evaluation of compensatory afforestation projects, catchment treatment plans, and CAMPA fund expenditures across states using

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spatial satellite data and geo-tagged plantation imagery.

48. (B) Demarcation
Demarcation is the practical process of identifying, surveying, establishing, and physically marking the exact statutory boundaries of a forest block on ground terrain. It involves erecting numbered boundary pillars, cairns, or cut lines to distinguish reserved or protected public forest lands clearly from adjoining private properties or revenue lands.

49. (B) DGPS (Differential Global Positioning System)
Differential Global Positioning System (DGPS) technology, combined with Satellite Remote Sensing and GIS, has largely replaced traditional chain-and-compass boundary surveys in Uttar Pradesh. DGPS provides high-precision geo-spatial coordinates for boundary pillars, establishing tamper-proof digital forest boundary maps that effectively resolve land disputes and prevent illegal encroachments.

50. (B) I, II, and IV
The Uttar Pradesh Forest Corporation was established under the UP Forest Corporation Act, 1974, to execute scientific timber logging, forest produce extraction, and regulated trade of tendu leaves. Enforcement of the Wildlife (Protection) Act, 1972, however, remains the exclusive statutory responsibility of the state Wildlife and Forest Department officers.

51. (C) Lucknow
The corporate headquarters of the Uttar Pradesh Forest Corporation is situated in Lucknow. Established as a statutory state enterprise, it oversees statewide commercial timber extraction, operates timber sale depots, manages minor forest produce trade, and supports Forest Department management objectives across various territorial divisions throughout Uttar Pradesh.

52. (A) 1 - 2 - 3 - 4 - 5
Forest land diversion follows a strict statutory sequence. First, the project proponent applies on the PARIVESH portal. The Central Government issues Stage-I in-principle clearance with conditions. After compliance and CAMPA payment by the agency, Stage-II final approval is granted, enabling the State Government to issue the final diversion order.

53. (C) The Indian Forest Act, 1927 and state public premises eviction laws.
Unauthorized encroachment on legally notified forest land is addressed under the penal provisions of the Indian Forest Act, 1927, alongside state public premises eviction statutes. Forest officers utilize these combined legal powers to issue summary eviction notices, remove unauthorized physical structures, and reclaim state-owned reserved or protected forest property.

54. (B) Any Forest Officer or Police Officer
Under Section 52 of the Indian Forest Act, 1927, when there is reason to believe that a forest offence has been committed regarding any forest produce, any Forest Officer or Police Officer is empowered to seize such produce along with all tools, boats, carts, or vehicles used in committing the offence.

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55. (A) 1 - 2 - 3 - 4 - 5
The administrative hierarchy of executive field staff in the Uttar Pradesh Forest Department rises progressively from Forest Guard at the base level to Forester, Deputy Ranger, and Forest Ranger. Above the range level, gazetted executive control passes to the Sub-Divisional Forest Officer, followed by Divisional Forest Officers and Conservators.

56. (A) The monetary value calculated for ecological service loss due to forest land diversion.
Net Present Value (NPV) represents the mandatory monetary compensation paid by user agencies diverting forest land for non-forest purposes. It quantifies the economic value of lost eco-system services—such as carbon sequestration, biodiversity conservation, water recharge, and climate regulation—over a multi-decadal horizon, calculated using standardized environmental valuation matrices.

57. (C) Vriksharopan Jan Andolan
Vriksharopan Jan Andolan is Uttar Pradesh's flagship annual afforestation program. Designed to mobilize massive public participation, local government bodies, school children, and civil society, the initiative executes record-breaking single-day tree plantation drives, planting hundreds of millions of saplings statewide to increase tree cover outside traditional forest areas.

58. (A) P-4, Q-3, R-2, S-1
The Forest Survey of India classifies forest canopy density into precise standard categories. Very Dense Forest features tree canopy density of 70 percent and above. Moderately Dense Forest spans 40 to 70 percent, Open Forest covers 10 to 40 percent, while Scrub represents degraded forest land with canopy density below 10 percent.

59. (D) Open Forest
As per the India State of Forest Report (ISFR) 2021, Open Forest forms the largest proportion of total forest cover in Uttar Pradesh. Open forests, having canopy densities between 10% and 40%, cover approximately 8,162 square kilometers, exceeding both Moderately Dense Forest and Very Dense Forest areas across the state.

60. (D) Assertion (A) is false but Reason (R) is true.
The Forest Rights Act of 2006 recognizes pre-existing customary occupancy and resource rights of forest-dwelling communities without changing underlying legal land classifications. It does not lead to de-reservation of Reserved Forests. Therefore, Assertion (A) is factually incorrect, while Reason (R) accurately explains the statutory legal nature of rights recognition under FRA.

61. (C) A Forest Court or a Revenue Officer not below Collector rank.
Under Section 17 of the Indian Forest Act, 1927, any person aggrieved by an order rejecting a land claim issued by the Forest Settlement Officer may prefer an appeal. The appeal lies either to a established Forest Court or to a designated executive Revenue Officer not below the rank of Collector.

62. (D) Arresting an offender committing a forest crime.
Section 26 of the Indian Forest Act, 1927 explicitly lists prohibited activities within Reserved Forests, including clearing land, grazing cattle, setting fires, and removing produce. However, arresting an offender committing a forest crime is a statutory duty exercised by authorized officers and is not an illegal prohibited act under the law.

63. (A) All rights are completely extinguished.
Under Section 35 of the Wildlife (Protection) Act, 1972, declaring an area as a National Park entails the highest level of legal protection. Upon final notification, all pre-existing human rights, grazing privileges, and private property claims inside the designated boundaries are completely extinguished or acquired by the State Government.

64. (B) In a Sanctuary, certain rights may be allowed to continue, whereas in a National Park, all rights are extinguished.
The primary legal distinction between a Wildlife Sanctuary and a National Park lies in human rights. In a Wildlife Sanctuary, the Chief Wildlife Warden may permit limited grazing, resource collection, or rights to continue. In contrast, within a National Park, all human rights, livestock grazing, and resource extraction are strictly prohibited.

65. (B) Degraded forest lands or vacant municipal lands in or near cities.
The Nagar Van Yojana is a central government initiative designed to create urban forests across India. These green spaces are developed primarily on degraded forest lands or vacant municipal plots located within or adjacent to urban areas, enhancing urban biodiversity, reducing pollution, and providing environmental amenities to city residents.

66. (B) I, II, and IV
The Forest (Conservation) Amendment Act, 2023 amended the 1980 statute, officially renaming it Van (Sanrakshan Evam Samvardhan) Adhiniyam. It exempted strategic border infrastructure projects within 100 kilometers of international borders and promoted non-forest plantations. However, it amended rather than repealed the original parent legislation of 1980.

67. (C) National Action Plan on Climate Change.
The National Mission for a Green India, commonly known as the Green India Mission, is one of the eight core national missions established under India's National Action Plan on Climate Change. It focuses on enhancing forest canopy density, restoring degraded forest ecosystems, and expanding tree cover to mitigate climate change impacts.

68. (D) Eco-Development Committee or Forest Protection Committee.
Under Joint Forest Management guidelines, local institutional frameworks are established at the village level to partner with state forest

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departments. Depending on proximity to core wildlife areas or production forests, these local community bodies function either as Forest Protection Committees (FPCs) or Eco-Development Committees (EDCs) to manage and protect natural resources.

69. (C) Mutation (Dakhil Kharij) in the Khatauni
Following the final settlement and notification of forest land boundaries under forest legislation, revenue records must reflect state ownership. The standard administrative procedure used to update local land registry records is entering a Mutation, locally known as Dakhil Kharij, within the village revenue record book called the Khatauni.

70. (A) I and II only
The Compensatory Afforestation Fund Act, 2016 established National and State Compensatory Afforestation Funds funded by user agencies diverting forest land. These statutory funds are strictly earmarked for afforestation, ecosystem restoration, and wildlife protection, and cannot be utilized for paying regular staff salaries or routine operational administrative expenses.

71. (D) World Bank
The Social Forestry Project launched in Uttar Pradesh in 1979 received substantial financial and technical assistance from the World Bank. The initiative aimed to plant fast-growing tree species on non-forest lands, village commons, roadsides, and canal banks to meet rural fuel, fodder, and timber demands while reducing exploitation of natural forests.

72. (A) Eucalyptus (Safeda)
Eucalyptus, locally known as Safeda, was extensively promoted during early Social Forestry drives across Uttar Pradesh due to its rapid growth rate and high commercial profitability. However, it later faced significant ecological criticism for consuming excessive groundwater, depleting soil moisture, and offering limited biodiversity support compared to native tree species.

73. (C) A Village Forest
Under Section 28 of the Indian Forest Act, 1927, when the State Government assigns to any village community the rights over land that has been constituted as a Reserved Forest, such land is legally designated as a Village Forest. The government prescribes rules for management, protection, and timber utilization.

74. (C) Assertion (A) is true but Reason (R) is false.
Section 33 of the Indian Forest Act, 1927 defines specific penal provisions and fines for committing forest offences within Protected Forests, such as illegal felling or burning trees. Reason (R) is incorrect because Section 33 contains binding statutory penal consequences rather than purely advisory guidelines lacking legal force.

75. (D) P-3, Q-1, R-4, S-2
In the Indian Forest Act, 1927, Section 4 provides for declaring the intention to constitute a reserved forest, while Section 20 issues the final notification. Section 29 deals with declaring protected forests, and Section 35 empowers the government to protect private lands or forests upon request of owners.

76. (B) Proximity of sugarcane fields offering shelter to large carnivores.
In the Terai region of Uttar Pradesh, extensive sugarcane cultivation immediately adjacent to Reserved Forests creates a major human-wildlife conflict zone. High sugarcane stalks provide tall, dense shelter similar to natural grasslands, drawing large carnivores like tigers and leopards near human settlements and increasing accidental encounters with agricultural workers.

77. (C) Providing a roadmap for permanent conversion of forest to agricultural land.
A Forest Working Plan serves as a scientific management document aimed at conserving forest ecosystems, regulating silvicultural operations, estimating timber growing stock, and ensuring sustained resource yields. Providing a roadmap for permanently converting forest lands into agricultural areas contradicts core forestry objectives and violates statutory forest conservation principles.

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78. (D) The smallest permanent unit of forest management with defined boundaries.
In scientific forestry and working plan formulation, a Compartment represents the basic territorial and administrative unit of management. It is a permanently demarcated geographical area of forest land with defined boundaries, carrying a specific designation to facilitate continuous recording of silvicultural treatments, growth inventory, and resource extraction activities.

79. (A) Right to hold and live in forest land for habitation or self-cultivation for livelihood.
The Forest Rights Act of 2006 recognizes the right of forest-dwelling Scheduled Tribes and traditional forest dwellers to hold, occupy, and cultivate forest land where they resided before the 2005 cut-off date. This right is strictly restricted to personal livelihood needs and prohibits commercial exploitation, fresh clearing, or poaching.

80. (A) I, II, and III
Under the Forest Rights Act, 2006, Other Traditional Forest Dwellers must prove residence for three generations (75 years) prior to December 13, 2005. The Gram Sabha initiates claim processing. However, recognized rights are non-transferable, non-alienable, and cannot be bought or sold to third parties, making Statement IV incorrect.

81. (B) Chapter VI (Section 41)
Chapter VI of the Indian Forest Act, 1927, specifically under Section 41, empowers the State Government to frame rules regulating the transit of all timber and other forest produce. This includes establishing pass systems, regulating transit routes, establishing check posts, and inspecting vehicles transporting forest commodities across territories.

82. (A) A permit issued by officers for transporting forest produce.
A Transit Pass, locally termed Ravanna, is an official document issued by authorized forest officers under transit rules. It certifies that specified timber or forest produce was legally harvested or sourced and authorizes its movement along designated transportation routes to prevent timber smuggling and illegal forest produce movement.

83. (C) Allowing laborers to grow crops in new plantations until tree canopy closes.
The Taungya system is an agro-silvicultural practice historically utilized in forest plantations. Under this system, local laborers are granted land patches within clear-felled forest blocks to cultivate agricultural food crops alongside young tree saplings until the tree canopy closes, achieving simultaneous crop harvesting and successful forest plantation establishment.

84. (D) Uttar Pradesh Forest and Wildlife Department
The Uttar Pradesh Forest and Wildlife Department is the primary state agency responsible for organizing Van Mahotsav during the first week of July each year. The department distributes free saplings, coordinates mass tree plantation drives across districts, and promotes public awareness regarding forest conservation and environmental greening.

85. (B) Reserved Forest → Protected Forest → Unclassed Forest
In Indian forestry law, Reserved Forests offer the highest level of statutory protection, where all activities are prohibited unless expressly permitted. Protected Forests offer an intermediate level, where activities are allowed unless specifically prohibited. Unclassed Forests provide the lowest level of statutory restriction and protective administrative oversight.

86. (B) Forest dwellers are granted ownership, access, use, and disposal rights over MFP.
The Forest Rights Act of 2006 vests forest-dwelling Scheduled Tribes and other traditional forest dwellers with legal ownership, management, and access rights over Minor Forest Produce. They hold full rights to harvest, collect, use, and dispose of non-timber forest items, including tendu leaves, bamboo, and medicinal herbs, for their livelihood.

87. (C) I and III only
Modern technological tools like GPS tracking and drone surveys enable highly efficient monitoring of illegal forest encroachments. Eviction operations routinely require coordinated action between Forest, Revenue, and Police departments. However, Section 61 deals with timber seizure procedures rather than authorizing summary shoot-at-sight actions, making Statement II legally incorrect.

88. (A) Double area (2:1) on degraded forest land, or equal area (1:1) on non-forest land.
Under the Forest (Conservation) Rules, user agencies diverting forest land must provide land for compensatory afforestation. The standard legal requirement mandates providing an equal area (1:1) of non-forest land. If suitable non-forest land is unavailable, afforestation must be undertaken over double the area (2:1) on degraded forest land.

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89. (C) Satellite imagery and thermal anomaly detection sensors.
Geographic Information Systems (GIS) and remote sensing technology track forest fires in real time through thermal anomaly sensors mounted on polar and geostationary satellites. Instruments like MODIS and VIIRS detect surface thermal hotspots, automatically transmitting coordinates to forest managers to enable swift field response and fire containment.

90. (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
The Forest (Conservation) Act, 1980 is a paramount central statute restricting forest diversion. Forests were placed on the Concurrent List via the 42nd Constitutional Amendment, granting Parliament constitutional authority. Consequently, Central law prevails over conflicting State actions under Article 254, making both statements true and causally explanatory.

91. (D) 42nd Amendment Act, 1976
The 42nd Constitutional Amendment Act of 1976 transferred the subject of "Forests" along with "Protection of Wild Animals and Birds" from the State List (List II) to the Concurrent List (List III) in the Seventh Schedule of the Indian Constitution, empowering both Parliament and State Legislatures to enact forestry laws.

92. (B) I, III, and IV
The Indian Forest Act, 1927 contains explicit penal provisions addressing illicit tree felling, setting forest fires, and land encroachment within reserved and protected forests. However, wildlife poaching is primarily governed and penalized under the specialized statutory framework of the Wildlife (Protection) Act, 1972, rather than the 1927 Act.

93. (C) A subdivision of a Range managed by a Forester or Guard.
In forest administrative hierarchy, a Beat is the smallest executive territorial division within a Forest Range. Managed directly by a Forest Guard or Forester, it serves as the frontline operational unit for daily ground patrolling, boundary verification, fire prevention, and monitoring local forest operations.

94. (D) Principal Chief Conservator of Forests (PCCF).
The Principal Chief Conservator of Forests (PCCF), functioning as the Head of Forest Force (HoFF), serves as the highest-ranking professional administrative authority heading the State Forest Department in Uttar Pradesh. The PCCF advises the government on policy, oversees administrative operations, and manages state forestry and wildlife conservation programs.

95. (D) 35 Crore
Under the Vriksharopan Mahabhiyan 2023, the Government of Uttar Pradesh established an ambitious state target to plant approximately 35 crore (350 million) saplings across the state. This massive public campaign involved multiple government departments, local civic bodies, farmers, and educational institutions to rapidly expand statewide green cover.

96. (B) A site-specific plan prepared jointly by JFMC and Forest Department for a village forest.
In Joint Forest Management (JFM), a Micro-Plan is a site-specific operational document developed jointly by the local Joint Forest Management Committee and forest officials. It outlines community resource requirements, specific afforestation activities, protection responsibilities, and benefit-sharing mechanisms tailored to the ecological conditions of a particular village forest.

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97. (B) UP Resin and Other Forest Produce (Regulation of Trade) Act, 1976.
In Uttar Pradesh, tapping and trade of resin from pine trees is regulated under the UP Resin and Other Forest Produce (Regulation of Trade) Act, 1976. This legal framework established a state monopoly over resin extraction and sale, preventing destructive over-tapping, curbing illegal trade, and ensuring sustainable forest resin management.

98. (A) Felling dead, dying, and diseased trees prescribed in the Working Plan.
While general commercial green felling is banned in UP's Reserved Forests, silvicultural operations permitting the removal of dead, dying, diseased, or fallen trees are allowed. These limited extractions must be explicitly prescribed in an approved Forest Working Plan to maintain forest hygiene, fire safety, and overall forest health.

99. (C) P-3, Q-4, R-1, S-2
In territorial forest administration, a Forest Circle is headed by a Conservator of Forests (CF), and a Forest Division is led by a Divisional Forest Officer (DFO). A Forest Range is managed by a Forest Ranger, while a Forest Section is supervised by a Forester, forming a structured hierarchy.

100. (A) I and II only
Section 66 of the Indian Forest Act, 1927 mandates that every Forest Officer and Police Officer shall prevent forest offences and empowers them to interfere to protect public forest property. However, officers cannot independently alter statutory Reserved Forest boundaries, which requires formal State Government notifications under Section 27.

101. (C) Section 64
Section 64 of the Indian Forest Act, 1927 empowers any Forest Officer or Police Officer to arrest without a warrant any person reasonably suspected of committing a forest offence punishable with imprisonment for one month or upwards, provided the offender refuses to give name and residence or gives suspicious details.

102. (B) They can accept monetary compensation from a suspect to release seized property or person.
Under Section 68 of the Indian Forest Act, 1927, authorized forest officers possess powers to compound offences. They can accept monetary compensation from individuals suspected of committing minor forest offences. Payment of compensation releases the suspect from custody, discharges seized property, and terminates further criminal judicial prosecution.

103. (D) Statutory confiscation proceedings under the amended provisions of the Indian Forest Act.
When a vehicle is seized for illegal timber transit, permanent state confiscation is governed by statutory confiscation proceedings under amended state provisions of the Indian Forest Act, 1927. Authorized forest officers conduct quasi-judicial proceedings, providing due hearing opportunities before passing orders to confiscate the vehicle to the state.

104. (A) Controlling the establishment, growth, composition, health, and quality of forests.
Silviculture is the scientific branch of forestry focused on controlling the establishment, growth, health, composition, and structural quality of forest stands. It applies ecological principles to meet specific management objectives, ensuring sustainable timber yield, natural regeneration, soil conservation, and forest ecosystem resilience across managed public and private forest landscapes.

105. (C) P-2, Q-3, R-1, S-4
In Uttar Pradesh forestry, Khair wood is primarily processed to extract Katha. Sal provides durable timber suitable for railway sleepers and structural construction. Tendu leaves are harvested extensively for bidi manufacturing, while Bamboo serves as versatile raw material for rural housing, handicrafts, and paper pulp production.

106. (A) Lantana camara
Lantana camara is a highly aggressive invasive alien shrub posing severe ecological threats in the Terai arc landscape of Uttar Pradesh. It forms dense impenetrable thickets, smothering native grasses and understory herbs. This drastically reduces palatable fodder for native herbivores like deer, altering natural forest regeneration and wildlife habitat quality.

107. (D) Preventive measure against forest fires.
Constructing and maintaining a Fire Line involves clearing a linear strip of forest vegetation and floor debris down to bare mineral soil. This physical gap disrupts fuel continuity across forest blocks, serving as a critical preventive measure that halts the horizontal spread of surface forest fires during dry seasons.

108. (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
The Uttar Pradesh Forest Corporation is responsible for organizing public auctions of seized illegal timber and forest produce. The Forest Department transfers confiscated material to the Corporation's managed depots, utilizing its established commercial channels to ensure transparent public sales and maximize revenue for the state exchequer.

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109. (C) Integrating trees and shrubs with crops or livestock on the same land unit.
Agroforestry is a land-management system that deliberately combines agricultural crops or livestock with woody perennials like trees and shrubs on the same land unit. This integrated approach enhances farm productivity, diversifies landowner income, improves soil structure, conserves moisture, and increases tree cover outside traditional forest boundaries.

110. (A) I, II, and III
The Forest Advisory Committee is a statutory body constituted under the Forest (Conservation) Act, 1980, comprising official members and independent experts. It advises the Ministry on proposals involving forest land diversion. Its recommendations are advisory, meaning the Central Government retains final authority to accept, modify, or reject them.

111. (A) Encouraging farmers to plant trees alongside crops for income and carbon sequestration.
The Sub-Mission on Agroforestry focuses on expanding tree plantation on farmland alongside agricultural crops. Operating in states like Uttar Pradesh, it provides farmers with quality planting material, financial incentives, and technical guidance to enhance farm income, build climate resilience, support raw material industries, and promote regional carbon sequestration.

112. (B) Forest Survey of India (FSI)
The India State of Forest Report is prepared and published biennially by the Forest Survey of India, an organization under the Ministry of Environment, Forest and Climate Change. The report provides national and state-level assessments of forest cover, tree cover, mangrove cover, growing stock, and forest carbon stocks.

113. (A) Less than 1 hectare
In the India State of Forest Report methodology, 'Tree Cover' refers to small tree patches, linear plantings, and isolated trees located outside recorded forest areas that measure less than one hectare in spatial extent, distinguished from 'Forest Cover' which requires land patches measuring one hectare or larger.

114. (A) I and II only
Under the Wildlife (Protection) Act, 1972, the District Collector inquires into rights before final sanctuary notification, and no new rights can be acquired post-Section 18 notification. However, the Forest Rights Act of 2006 applies to all forest lands, including National Parks and Sanctuaries, making Statement III factually incorrect.

115. (A) 3 - 2 - 1 - 4
The chronological enactment sequence of major Indian environmental statutes begins with the Indian Forest Act in 1927. This was followed by the Wildlife (Protection) Act in 1972, the Forest (Conservation) Act in 1980, and finally the Scheduled Tribes and Other Traditional Forest Dwellers (Forest Rights) Act in 2006.

116. (D) Ensuring speed and transparency in issuing transit passes and nursery management.
Digital governance initiatives like the e-Forest platform in Uttar Pradesh aim to modernize administrative workflows. By automating processes such as issuing online timber transit passes, managing nursery inventory, tracking afforestation targets, and handling public services, the platform enhances operational transparency, reduces delays, and minimizes administrative friction for citizens.

117. (C) It is a center for breeding Ghariyals and serves as a major urban forest.
Kukrail Reserve Forest in Lucknow is an important urban forest and conservation center in Uttar Pradesh. Established in the 1970s, it houses a major crocodile and Ghariyal captive breeding center, serves as a vital green lung for the capital city, and promotes environmental education and public eco-tourism.

118. (B) Tropical Dry Deciduous Forests
The Vindhyan forest zone spanning Mirzapur and Sonbhadra districts in southern Uttar Pradesh is characteristically dominated by Tropical Dry Deciduous Forests. Influenced by high summer temperatures and moderate rainfall, these forests feature tree species like Salai, Khair, Mahua, Tendu, and Thorny Acacia that drop leaves during dry seasons.

119. (D) The planned years between regenerating a forest crop and its final felling.
In silviculture and forest management, the Rotation Period denotes the planned timeframe measured in years between the initial establishment or natural regeneration of a forest crop and its final harvest felling. It is calculated

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to maximize timber yield, economic return, or ecological objectives based on tree growth rates.

120. (D) Assertion (A) is false but Reason (R) is true.
In T.N. Godavarman Thirumulpad v. Union of India (1996), the Supreme Court expanded the definition of "forest" to include all areas matching dictionary definitions or listed in records, regardless of ownership. Consequently, the Forest (Conservation) Act applies to unclassed forests, rendering Assertion (A) false and Reason (R) true.

121. (C) Construction of small wildlife waterholes or check dams.
Under Section 2 of the Forest (Conservation) Act, 1980, activities directly related to forest management, protection, and conservation are classified as forestry operations. Constructing waterholes, check dams, fire lines, or guard huts supports forest management, whereas agricultural crop production, commercial zoos, and mining constitute non-forest activities.

122. (A) Timber, charcoal, resin, lac, bark, and specified items whether from a forest or not.
Under Section 2(4) of the Indian Forest Act, 1927, "Forest-produce" includes timber, charcoal, wood-oil, resin, natural varnish, lac, bark, and gum, whether found in or brought from a forest or not. It also encompasses grass, leaves, flowers, fruits, and minerals when found in or brought from forests.

123. (D) The State Government
Under Chapter VIII of the Indian Forest Act, 1927, all unmarked timber, drift wood, and stranded timber found floating in rivers or lying on riverbanks are deemed to be public property. Such timber belongs legally to the State Government until a claimant establishes valid ownership rights before an authorized forest officer.

124. (C) Chapter VIII
Chapter VIII of the Indian Forest Act, 1927 contains statutory provisions governing drift, stranded, and unmarked timber. It empowers the State Government to collect, store, and regulate unclaimed river-borne timber, defining public notification procedures, claim verification processes, and disposal mechanisms for unclaimed forest produce collected along watercourses.

125. (C) Encourage tree planting by dedicating trees in memory of loved ones.
Smriti Vans, or Memorial Forests, are community afforestation initiatives introduced by the Uttar Pradesh Government. The program encourages citizens, civic groups, and families to plant and sponsor saplings in designated public forest areas to commemorate personal milestones, achievements, or deceased loved ones, fostering public stewardship over tree conservation.

126. (D) P-2, Q-4, R-1, S-3
The Nagar Van Yojana focuses on creating urban green spaces. School Nursery Yojana engages students in growing tree saplings. CAMPA manages financial funds dedicated to compensatory afforestation projects, and Project Tiger directs nationwide efforts to conserve wild tiger populations and preserve their critical forest habitats.

127. (A) Wildlife (Protection) Act, 1972
The Wildlife (Protection) Act, 1972 provides the statutory legal framework for protecting wild animal, bird, and plant species in India. It empowers State Governments to declare and manage Protected Areas, specifically National Parks, Wildlife Sanctuaries, Conservation Reserves, and Community Reserves, regulating activities inside their boundaries.

128. (B) Dudhwa Tiger Reserve
Katarniaghat Wildlife Sanctuary, located in Bahraich district, forms a vital component of the larger Dudhwa Tiger Reserve landscape alongside Dudhwa National Park and Kishanpur Wildlife Sanctuary. Containing extensive terai reserved forests, grasslands, and riverine habitats, it provides critical movement corridors for tigers, rhinos, elephants, and Gangetic dolphins.

129. (B) Employs core, buffer, and transition zones for conservation and sustainable use.
A Biosphere Reserve differs from a traditional Reserved Forest by integrating conservation with sustainable human development across designated core, buffer, and transition zones. While core areas maintain strict protection, buffer and transition zones accommodate scientific research, environmental education, traditional agriculture, and sustainable economic activities by local communities.

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130. (A) I and II only
During reserved forest settlement, the Forest Settlement Officer investigates rights to pasture and produce and can acquire claimed land under land acquisition laws. Furthermore, the officer possesses authority under Section 11 to alter proposed forest boundaries to exclude claimed private land, making Statement III factually incorrect.

131. (B) I, II, and IV
Private forests can be regulated under Chapter V of the Indian Forest Act, 1927, and tree felling in UP is governed by the UP Protection of Trees Act, 1976. Permission is required for felling specified protected tree species even on private lands, rendering Statement III factually incorrect.

132. (D) To receive, process, and forward forest diversion proposals to MoEFCC.
In each state, the Nodal Officer appointed under the Forest (Conservation) Act, 1980 functions as the central administrative officer responsible for receiving, scrutinizing, processing, and forwarding statutory forest land diversion proposals submitted by user agencies to the Ministry of Environment, Forest and Climate Change for central regulatory clearance.

133. (C) Particularly Vulnerable Tribal Groups (PVTGs) and Pre-agricultural Communities.
The Forest Rights Act of 2006 contains explicit provisions recognizing customary "Habitat Rights" over community territories for Particularly Vulnerable Tribal Groups (PVTGs) and pre-agricultural communities. These rights protect traditional habitats, cultural livelihoods, and spatial territorial rights of vulnerable indigenous groups from alienation and industrial displacement.

134. (B) Section 4(4)
Section 4(4) of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 serves as a key protective clause. It mandates that recognized forest rights are non-alienable, non-transferable, and non-assignable, ensuring land titles remain heritable within families and preventing land transfer to non-tribal entities.

135. (D) P-2, Q-1, R-4, S-3
Coppicing involves cutting trees low to stimulate fresh shoot regeneration. Thinning selectively removes stems in young stands to reduce competition. Clear felling removes all trees simultaneously in a designated area, whereas selective logging harvests only specific mature trees based on girth or commercial species criteria.

136. (A) UP Forest Corporation in coordination with the Forest Department.
Eco-tourism initiatives within state forest zones in Uttar Pradesh are primarily executed by the Uttar Pradesh Forest Corporation working in close coordination with the Forest Department. Together, they develop eco-lodges, manage jungle safaris, regulate visitor flow, and maintain nature trails while ensuring ecological conservation across protected habitats.

137. (C) Chitrakoot
Ranipur Tiger Reserve, notified as Uttar Pradesh's fourth tiger reserve, is located in the Chitrakoot district within the Vindhyan region. Encompassing dry deciduous forests and rocky terrain, the reserve provides critical habitat for tigers, leopards, sloths, and ungulates, strengthening wildlife conservation and ecological connectivity across Central India.

138. (A) Ashoka (Saraca asoca)
The state tree of Uttar Pradesh is Ashoka, scientifically known as Saraca asoca. Recognized for its deep ecological, cultural, and medicinal importance, it features prominently in statewide afforestation drives, urban greening projects, and conservation programs organized across various districts by the State Forest and Wildlife Department.

139. (D) Afforestation, soil, and moisture conservation in watersheds to prevent siltation.
A Catchment Area Treatment (CAT) plan focuses on executing afforestation, soil conservation, bio-engineering, and moisture retention measures within river and reservoir catchments. By stabilizing topsoil and reducing runoff speed, CAT plans prevent heavy reservoir siltation, protect aquatic ecosystems, and ensure long-term hydrologic stability for water development projects.

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140. (A) I, II, and III
Joint Forest Management Committees comprise a General Body consisting of all adult village members and an Executive Committee managing routine operations. The local Forest Guard or Forester serves as ex-officio Member Secretary. Statement IV is incorrect because committees are government-recognized state bodies rather than purely private entities.

141. (C) Stage-I approval granted by MoEFCC stipulating conditions for final diversion.
In forest land diversion under the Forest (Conservation) Act, 1980, the Letter of Intent corresponds to Stage-I in-principle approval issued by the Ministry of Environment, Forest and Climate Change. It lists mandatory conditions, such as transferring compensatory land and depositing CAMPA funds, required before granting Stage-II final clearance.

142. (C) Assertion (A) is true but Reason (R) is false.
Van Panchayats in Uttarakhand represent unique democratic village institutions managing local community forests. However, Reason (R) is incorrect because Van Panchayats were established historically under the Kumaon Panchayat Forest Rules of 1931, long predating the enactment of the Scheduled Tribes and Other Traditional Forest Dwellers Act of 2006.

143. (A) Declaring part of the forest a Wildlife Sanctuary.
In-situ conservation refers to conserving natural ecosystems, wild species, and habitats within their natural surroundings. Declaring a portion of a Reserved Forest as a Wildlife Sanctuary provides statutory protection to flora and fauna in their natural habitat, whereas botanical gardens, seed banks, and zoos represent ex-situ conservation methods.

144. (B) Afforestation plants trees on non-forest land; Reforestation replants cleared forest areas.
Afforestation involves establishing new tree plantations or forests on land that historically did not contain forest cover or was non-forested for long periods. Conversely, Reforestation refers to re-establishing tree cover through planting or natural regeneration on lands that were recently cleared, deforested, or harvested.

145. (B) It generates revenue, removes over-mature trees, and enables regeneration of young stock.
Scientific harvesting of timber in production forests is preferred over natural decay because it allows systematic extraction of over-mature trees before rot reduces timber quality. This operational practice generates state revenue, opens canopy gaps to promote natural or artificial regeneration of young stock, and maintains timber productivity.

146. (A) Tendu leaves
Under Section 2(i) of the Forest Rights Act, 2006, Minor Forest Produce includes all non-timber forest produce of plant origin. Tendu leaves, bamboo, brushwood, stumps, canes, tussar, cocoons, honey, wax, lac, and medicinal plants are explicitly classified as minor forest produce, whereas major commercial timber logs are excluded.

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147. (C) The State Government
Section 28 of the Indian Forest Act, 1927 provides that when a Reserved Forest is assigned to a village community as a Village Forest, the State Government holds statutory power to make rules. These rules regulate management, timber distribution, pasture usage, protection duties, and community access rights.

148. (C) Section 74
Section 74 of the Indian Forest Act, 1927 provides legal indemnity to public servants. It stipulates that no suit, prosecution, or legal proceeding shall lie against any forest officer for anything done, or intended to be done, in good faith under the statutory provisions or rules of the Act.

149. (A) Notification under Section 4 → Inquiry by Forest Settlement Officer → Resolution of claims → Final notification under Section 20
Establishing a Reserved Forest follows a sequential statutory procedure under the Indian Forest Act, 1927. The process initiates with a Section 4 preliminary notification, followed by detailed claim inquiries by the Forest Settlement Officer, settlement or commutation of identified rights, and culminates in a final Section 20 notification declaring reserved status.

150. (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
Prior to 1980, State Governments could unilaterally de-reserve forests under local laws. The enactment of the Forest (Conservation) Act, 1980 made prior approval from the Central Government legally mandatory for any de-reservation order under Section 2, greatly restricting state powers and ensuring both statements are true and causally linked.

151. (B) Imprisonment up to two years, or fine, or both.
Section 63 of the Indian Forest Act, 1927 addresses offences related to tree marking and boundary tampering. Counterfeiting, altering, defacing, or obliterating boundary marks, tree marks, or property marks on timber is punishable with imprisonment for a term extending up to two years, or fine, or both.

152. (A) Revenue Department.
Boundary disputes between state forest lands and adjoining revenue or private agricultural lands require joint demarcation surveys. The Forest Department coordinates directly with the State Revenue Department, utilizing revenue records, Khatauni entries, and joint field measurements with Tehsildars and Patwaris to establish precise, legally binding boundary lines.

153. (C) It initiates the process for determining individual or community forest rights.
Under Section 6(1) of the Forest Rights Act, 2006, the Gram Sabha serves as the primary statutory authority empowering local forest communities. It initiates the process for determining the nature and extent of individual or community forest rights by receiving claims, verifying occupational evidence, and passing initial resolutions.

154. (A) Forest (Conservation) Act, 1980
When an industrial project requires diverting forest land, statutory forest clearance must be obtained under Section 2 of the Forest (Conservation) Act, 1980. This clearance process is distinct from environmental clearance under the Environment (Protection) Act, 1986, requiring prior central approval and compensatory afforestation commitments.

155. (B) II and III only
The India State of Forest Report relies on remote sensing satellite data, such as Resourcesat LISS III sensors, to evaluate vegetation cover. It provides statewide estimates for both forest cover and tree cover. Statement I is false because ISFR categorizes forests based on canopy density rather than legal ownership.

156. (B) A Forest Circle
In the administrative framework of the Uttar Pradesh Forest Department, a Conservator of Forests (CF) serves as the officer in charge of a Forest Circle. A Circle comprises several territorial Forest Divisions, with the Conservator supervising Divisional Forest Officers, reviewing working plan execution, and monitoring regional forest protection.

157. (C) Aerial seeding and afforestation with hardy species like Babool.
To combat soil erosion and stabilize degraded ravine landscapes along the Chambal and Yamuna catchments, Uttar Pradesh employs soil conservation afforestation. Techniques involve aerial seeding and systematic plantation of deep-rooting, drought-hardy species such as Babool (Acacia nilotica) to bind soil, reduce surface runoff, and restore vegetation cover.

158. (D) Reserved Forests of the Pilibhit Division.
Pilibhit Tiger Reserve, formally notified in 2014, was carved out predominantly from the contiguous Reserved Forests of the Pilibhit Forest Division. Situated along the Indo-Nepal border in the Terai region, these reserved forests contained dense Sal tracts, tall grasslands, and river systems ideal for tiger conservation.

159. (A) The time elapsing between two successive main fellings on the same area.
In forest working plans, the Felling Cycle refers to the planned interval of time elapsing between two successive main fellings or silvicultural extractions carried out in the same forest compartment or working circle. It ensures adequate time for timber stands to recover and regenerate naturally between harvests.

160. (B) A non-forest activity requiring prior approval and compensatory afforestation.
Installing wind energy turbines and associated power transmission infrastructure on statutory forest land is legally categorized as a non-forest

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activity under the Forest (Conservation) Act, 1980. Consequently, such renewable energy projects require prior Central Government approval, Net Present Value payment, and mandatory compensatory afforestation.

161. (B) P-3, Q-1, R-4, S-2
Usufruct denotes the legal right to collect and use produce without destroying the property. Seizure involves taking physical possession of suspected items. Compounding refers to accepting monetary compensation to drop criminal charges, while Confiscation represents the formal legal transfer of seized property ownership to the State Government.

162. (A) Toxic invasive weed suppressing native fodder and degrading tiger habitat.
Lantana camara is systematically eradicated from UP's Protected and Reserved Forests because it is an aggressive, toxic invasive weed. It aggressively suppresses native palatable grasses and understory herbs, causing severe habitat degradation for wild herbivores, which subsequently impacts predator prey bases and overall wildlife ecosystem balance.

163. (C) The Survey of India
The legal and topographical boundaries of Reserved Forests in India are mapped and recorded on standard topographical sheets produced by the Survey of India. Serving as the national mapping agency, it collaborates with State Forest Departments to publish official topo-maps depicting legal forest boundaries, contours, and physical terrain features.

164. (D) Ecological restoration of degraded forests and fringe community development via JFM.
The National Afforestation Programme is a flagship central scheme implemented through Forest Development Agencies at the division level. Its core objective is ecological restoration of degraded forests and eco-development in fringe villages by empowering local Joint Forest Management Committees, promoting sustainable forest governance, and improving community rural livelihoods.

165. (C) Species, length, and girth classes.
According to the operational timber disposal procedures of the Uttar Pradesh Forest Corporation, timber logs harvested or recovered are arranged in sale depots into standardized auction lots. These lots are sorted and categorized based on timber species, log length, and girth classes to ensure transparent market pricing.

166. (B) The District Magistrate / District Collector
Under Section 6(5) of the Forest Rights Act, 2006, the District Level Committee gives final approval to forest rights records. This statutory committee is headed by the District Magistrate or District Collector, ensuring administrative coordination between revenue, tribal welfare, and forest officials for final record entry.

167. (D) Income tax assessment of staff.
A Forest Working Plan focuses on scientific forest management, containing timber growing stock assessments, silvicultural systems, regeneration targets, yield calculations, and conservation prescriptions. Income tax assessment of administrative staff is a personal financial taxation matter entirely outside the scope and technical objectives of a forest working plan.

168. (B) I, II, and IV
Controlled burning and maintaining cleared fire lines are established techniques to mitigate forest fires, while the Forest Survey of India provides satellite thermal fire alerts. Statement III is incorrect because forest fires in UP's deciduous forests are predominantly caused by human activities, such as burning dry leaves or discarding cigarettes.

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169. (C) Concessional rights granted to villagers to meet domestic needs for timber, fuel, and fodder.
Historically in Indian forest administration, Nistar rights refer to customary concessions or legal rights granted to local rural villagers. These rights allow communities to extract specific forest produce—such as small timber for agricultural implements, firewood, thatch grass, and fodder—from local government forests to satisfy domestic livelihood needs.

170. (A) Artificial regeneration plantations, fire prevention, and wildlife protection.
Under the Compensatory Afforestation Fund Act, 2016, CAMPA funds are strictly earmarked for environmental regeneration. Permitted uses include artificial plantation drives, natural regeneration assistance, forest fire prevention, soil moisture conservation, wildlife habitat management, and boundary demarcation, while

administrative vehicle purchases or non-forestry expenditures are strictly prohibited.

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CHAPTER 03
Elephant and Tiger Reserves

1. In which national park was Project Tiger officially launched on April 1, 1973?
(A) Kanha National Park
(B) Jim Corbett National Park
(C) Bandhavgarh National Park
(D) Dudhwa National Park

2. What is the funding pattern of Project Tiger, a Centrally Sponsored Scheme, for the maintenance of Tiger Reserves in normal states?
(A) 100% central funding for both core and buffer areas
(B) 60% central funding for core areas and 40% for buffer areas
(C) 50% central funding for both core and buffer areas
(D) 100% central funding for core areas and 50% for buffer areas

3. What was the primary ecological objective behind the launch of Project Tiger in 1973?
(A) To ensure the maintenance of a viable population of tigers in their natural habitats
(B) To strictly isolate tigers in zoological parks for captive breeding
(C) To export tigers to African nations to maintain genetic diversity
(D) To train tigers for regulated ecotourism and safari shows

4. How many tiger reserves were initially established during the launch of Project Tiger in 1973-74?
(A) 5
(B) 7
(C) 9
(D) 12

5. Which nodal ministry at the central level is responsible for administering Project Tiger?
(A) Ministry of Environment, Forest and Climate Change
(B) Ministry of Earth Sciences
(C) Ministry of Agriculture and Farmers Welfare
(D) Ministry of Science and Technology

6. What was the main catalyst that led to the formation of the Tiger Task Force and the subsequent creation of the National Tiger Conservation Authority (NTCA)?
(A) The sudden rise in tiger population causing severe human-wildlife conflict in 2004
(B) The demand for new tiger reserves by various state governments
(C) The initiation of the International Big Cats Alliance
(D) The local extinction of tigers in Sariska Tiger Reserve reported in 2005

7. In which year was Project Elephant launched by the Government of India to provide financial and technical support to major elephant bearing states?
(A) 1973
(B) 1986
(C) 1992
(D) 2002

8. Which of the following is NOT an explicitly stated primary objective of Project Elephant?
(A) To protect elephants, their habitat, and elephant corridors
(B) To address issues of human-animal conflict
(C) To strictly promote commercial trading of captive elephants
(D) To ensure the welfare of domesticated (captive) elephants

9. What is the full form of the MIKE programme, an international collaboration that operates within Project Elephant in India?
(A) Management of Indian Keystone Elephants
(B) Mapping of Isolated and Keystone Elephants
(C) Mechanism for Investigating Killed Elephants
(D) Monitoring of Illegal Killing of Elephants

10. The comprehensive report titled "Gajah", which provided a blueprint for securing the future of elephants in India, was submitted in 2010 by which task force?
(A) The Elephant Task Force (ETF)
(B) The National Elephant Conservation Authority

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(C) The Wildlife Institute of India Advisory Board
(D) The State Elephant Management Committee

11. Which major nationwide public awareness campaign was launched in 2011 by the Ministry of Environment and Forests in partnership with the Wildlife Trust of India?
(A) Save the Tusker
(B) Haathi Mere Saathi
(C) Gaj Utsav
(D) Elephant First

12. In which year was the Asian Elephant officially declared as the National Heritage Animal of India?
(A) 1992
(B) 2005
(C) 2010
(D) 2020

13. Which of the following is currently the largest Tiger Reserve in India by total area?
(A) Nagarjunasagar Srisailam Tiger Reserve
(B) Corbett Tiger Reserve
(C) Sundarbans Tiger Reserve
(D) Namdapha Tiger Reserve

14. Consider the following statements regarding Tiger Reserves in India:
I. Bor Tiger Reserve is recognized as one of the smallest tiger reserves in India.
II. Namdapha Tiger Reserve is known as the highest elevation tiger reserve in the world.
III. Punjab and Haryana have two tiger reserves each.
Which of the above statements is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II and III

15. According to recent data, which state in India has the highest number of recognized Tiger Reserves?
(A) Uttar Pradesh
(B) Assam
(C) Kerala
(D) Madhya Pradesh

16. Veerangana Durgavati Tiger Reserve, recently notified as a new Tiger Reserve, is located in which state?
(A) Rajasthan
(B) Chhattisgarh
(C) Madhya Pradesh
(D) Maharashtra

17. Which of the following Tiger Reserves spans across multiple states in Central India?
(A) Kanha Tiger Reserve
(B) Pench Tiger Reserve
(C) Bandhavgarh Tiger Reserve
(D) Panna Tiger Reserve

18. As per official notifications up to mid-2023, approximately how many Tiger Reserves are there in India?
(A) 39
(B) 45
(C) 54
(D) 65

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19. Match the Tiger Reserves of Uttar Pradesh in List I with their respective primary districts in List II**:**
List I: (Tiger Reserve)
P. Dudhwa
Q. Pilibhit
R. Amangarh
S. Ranipur
List II: (District)
1. Bijnor
2. Chitrakoot
3. Lakhimpur Kheri
4. Pilibhit
(A) P-3, Q-4, R-1, S-2
(B) P-3, Q-4, R-2, S-1
(C) P-4, Q-3, R-1, S-2
(D) P-1, Q-2, R-3, S-4

20. Amangarh Tiger Reserve in Uttar Pradesh was originally created as a buffer zone for which major adjoining National Park?
(A) Dudhwa National Park
(B) Rajaji National Park
(C) Jim Corbett National Park
(D) Nanda Devi National Park

21. In which year was Dudhwa National Park in Uttar Pradesh brought under the ambit of Project Tiger to become Dudhwa Tiger Reserve?
(A) 1973
(B) 1987-88
(C) 1999-2000
(D) 2014

22. Which Tiger Reserve in Uttar Pradesh received the prestigious international TX2 award in 2020 for doubling its tiger population in a record time?

(A) Dudhwa Tiger Reserve
(B) Amangarh Tiger Reserve
(C) Ranipur Tiger Reserve
(D) Pilibhit Tiger Reserve

23. Ranipur Tiger Reserve, notified as a tiger reserve in Uttar Pradesh, is geographically located in which region?
(A) Terai Belt
(B) Bundelkhand
(C) Purvanchal
(D) Doab region

24. Which two significant rivers flow through the Dudhwa Tiger Reserve landscape, contributing to its rich marshy ecology?
(A) Ganga and Yamuna
(B) Gomti and Rapti
(C) Mohana and Suhel
(D) Betwa and Ken

25. In which year was the Pilibhit forest area officially declared as a Tiger Reserve by the Government of Uttar Pradesh?
(A) 2008
(B) 2014
(C) 2018
(D) 2022

26. Consider the following statements about Uttar Pradesh Tiger Reserves:
I. Dudhwa Tiger Reserve is located along the Indo-Nepal border.
II. Amangarh is located in the Bijnor district of Uttar Pradesh.
III. Ranipur Tiger Reserve was the first tiger reserve established in Uttar Pradesh.
IV. The Terai landscape is critical for connecting Dudhwa and Pilibhit populations.
Which of the above statements are correct?
(A) I, II, and III only
(B) I, II, and IV only
(C) II, III, and IV only
(D) I, III, and IV only

27. As of the end of 2022, what is the total number of notified Elephant Reserves in India?
(A) 15
(B) 24
(C) 33
(D) 45

28. Which was the first Elephant Reserve to be notified in India in the year 2001?
(A) Nilgiri Elephant Reserve
(B) Singhbhum Elephant Reserve
(C) Kameng Elephant Reserve
(D) Mayurbhanj Elephant Reserve

29. The Terai Elephant Reserve (TER), spanning 3,049 sq km, is located in which state?
(A) Uttar Pradesh
(B) Uttarakhand
(C) Bihar
(D) West Bengal

30. Which Indian state holds the distinction of having the largest population of wild elephants as per the 2017 census estimates?
(A) Kerala
(B) Assam
(C) Karnataka
(D) Tamil Nadu

31. Consider the following states regarding wild elephant population according to the 2017 Elephant Census:
I. Kerala
II. Karnataka
III. Assam
Which of the following represents the correct sequence when arranged in descending order of their wild elephant population?
(A) II, III, I
(B) III, II, I
(C) I, II, III
(D) II, I, III

32. Elephant Reserves in India are declared by which authority under the administrative framework of Project Elephant?
(A) Directly by the President of India through executive decrees
(B) By the Supreme Court of India via public interest litigations
(C) By respective State Governments following Central approval
(D) Directly by the United Nations Environment Programme council

33. The National Tiger Conservation Authority (NTCA) was established following an amendment to which major environmental legislation?
(A) Forest (Conservation) Act, 1980
(B) Wildlife (Protection) Act, 1972
(C) Environment (Protection) Act, 1986
(D) Indian Forest Act, 1927

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34. Who serves as the ex-officio Chairperson of the National Tiger Conservation Authority (NTCA)?
(A) Prime Minister of India acting as ex-officio head
(B) Union Secretary, Ministry of Environment and Forests
(C) Director General of Forests and Special Secretary
(D) Minister for Environment, Forest and Climate Change

35. What is the legal status of the National Tiger Conservation Authority (NTCA)?
(A) It is a statutory body
(B) It is a constitutional body
(C) It is an advisory NGO
(D) It is an ad-hoc executive committee

36. According to the constitution of the NTCA, how many Members of Parliament are included as members of the Authority?
(A) None (no parliamentary representation is provided)
(B) 2 members (both representing the Lok Sabha)
(C) 3 members (2 from Lok Sabha and 1 from Rajya Sabha)
(D) 5 members (3 from Lok Sabha and 2 from Rajya Sabha)

37. Which of the following is a primary function of the NTCA?
(A) Approving Tiger Conservation Plans prepared by State Governments
(B) Directly apprehending wildlife poachers across all Indian states
(C) Issuing timber extraction and commercial logging permits in reserves
(D) Managing public zoos and captive breeding facilities nationwide

38. Given below are two statements, one labeled as Assertion (A) and the other as Reason (R):
Assertion (A): The National Tiger Conservation Authority (NTCA) can issue binding directives to state governments for tiger conservation.
Reason (R): NTCA is a statutory body empowered under the Wildlife (Protection) Act, 1972 to ensure standard implementation of tiger conservation plans.
Which of the following is correct?
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

39. What is the frequency of the All-India Tiger Estimation (census) conducted by the NTCA and the Wildlife Institute of India?
(A) Every 2 years
(B) Every 3 years
(C) Every 4 years
(D) Every 5 years

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40. What is the name of the software-based application introduced by NTCA for patrolling and ecological monitoring in Tiger Reserves?
(A) T-WATCH
(B) E-TIGER
(C) M-STrIPES
(D) TIGER-TRACK

41. In the All-India Tiger Estimation methodology, Phase I primarily involves which of the following activities?
(A) Spatial capture-recapture sampling using automated camera traps
(B) Genetic sampling and DNA profiling of tiger scats in laboratories
(C) Aerial drone surveys and satellite mapping of designated core zones
(D) Ground surveys by forest staff for carnivore signs and prey data

42. Which advanced statistical methodology is globally accepted and used by India to estimate tiger populations from camera trap data?
(A) Spatially Explicit Capture-Recapture (SECR) framework
(B) Simple Linear Regression Analysis for trend prediction
(C) Stratified Random Sampling Methods across landscapes
(D) Mark-Release Point Estimation Models for populations

43. Why was the traditional 'Pugmark Census Method' largely replaced by camera trapping for tiger estimation?
(A) Camera trapping equipment and deployment are significantly cheaper than pugmark surveys.
(B) Pugmark identification is highly subjective and prone to overestimation.
(C) Tigers deliberately conceal their paw prints

in dense vegetative terrain.
(D) The Wildlife Protection Act explicitly prohibited manual tracking of pugmarks.

44. Which premier scientific institution acts as the principal technical partner of NTCA in conducting the All-India Tiger Estimation?
(A) Wildlife Institute of India (WII)
(B) Zoological Survey of India (ZSI)
(C) Forest Survey of India (FSI)
(D) Indian Institute of Science (IISc)

45. Consider the following statements regarding Elephant Corridors:
I. They are narrow strips of forested or otherwise natural habitat connecting larger elephant populations.
II. They are crucial for maintaining genetic diversity and preventing isolated populations.
III. Infrastructure development has no significant impact on these corridors due to elephant adaptability.
Which of the above statements is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II and III

46. The comprehensive publication titled 'Right of Passage' which documents elephant corridors in India is authored by which organisation in collaboration with the Government?
(A) World Wide Fund for Nature (WWF)
(B) Bombay Natural History Society (BNHS)
(C) Centre for Science and Environment (CSE)
(D) Wildlife Trust of India (WTI)

47. According to official reports by the central government, approximately how many active elephant corridors have been identified across India?
(A) Exactly 50
(B) Around 88
(C) Approximately 150
(D) Over 500

48. Which of the following represents the most significant anthropogenic threat to the functional integrity of elephant corridors today?
(A) Afforestation and eco-restoration projects led by local non-governmental organizations
(B) Expansion of linear infrastructure like highways, railways, and canals
(C) Establishment of new national parks and wildlife sanctuaries in forest peripheries
(D) Deployment of automated camera traps and electronic monitoring gear in reserves

49. To protect elephant movement, which type of regulatory zoning is often proposed around critical elephant corridors?
(A) Exclusive Economic Zones (EEZ)
(B) Special Economic Zones (SEZ)
(C) Demilitarized Zones (DMZ)
(D) Eco-Sensitive Zones (ESZ)

50. What is the fundamental ecological driver behind the escalating human-elephant conflict (HEC) in India?
(A) The severe fragmentation and degradation of natural elephant habitats
(B) The sudden shift of elephants from a herbivorous to an omnivorous diet
(C) The deliberate introduction of African elephants into Indian forests
(D) The strict prohibition of ecotourism activities within designated elephant reserves

51. Which of the following is a widely recommended non-lethal, physical mitigation measure to prevent elephants from raiding agricultural crops?
(A) Installation of high-voltage lethal electric boundary fences
(B) Construction of deep open pit traps fitted with hidden spikes
(C) Hanging solar-powered fences and chili-rope fences
(D) Systematic and extensive spraying of chemical defoliants

52. Match the innovative human-wildlife conflict mitigation strategies in List I with their key components in List II**:**
List I: (Strategy)
P. Project RE-HAB
Q. Early Warning System
R. Physical Barrier
S. Acoustic Deterrent
List II: (Key Component)
1. SMS alerts to villagers
2. Bee boxes acting as biological fences
3. Elephant-proof trenches
4. Use of loud recordings and sirens
(A) P-2, Q-1, R-3, S-4
(B) P-1, Q-2, R-4, S-3
(C) P-3, Q-4, R-1, S-2
(D) P-4, Q-3, R-2, S-1

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53. How do state forest departments generally provide financial relief for crop damage caused by wild elephants?
(A) By purchasing all damaged agricultural crops at double the prevailing market price
(B) By granting full land tax exemptions to the entire affected village for ten years
(C) By providing high-yield seeds and fertilizer for the next five years unconditionally
(D) Through structured ex-gratia compensation following official damage verification

54. In human-elephant conflict prone zones, the use of automated infrared sensors along railway tracks is primarily intended to:
(A) Automatically electrocute elephants as they approach active railway lines
(B) Alert locomotive drivers of elephant presence to prevent train hits
(C) Measure and log the height of passing elephants for official census records
(D) Continuously record and transmit the ambient temperature of the surrounding forest

55. Which of the following scenarios is a primary cause for tigers straying into human-dominated landscapes, leading to human-tiger conflict?
(A) Complete absence of natural vegetation and prey species in surrounding buffer zones
(B) The continuous sound of heavy highway vehicles attracting curious young tigers
(C) Sub-adult tigers dispersing in search of new territories and adequate prey
(D) Systematic and deliberate feeding of wild tiger populations by local villagers

56. What does the NTCA Standard Operating Procedure (SOP) mandate regarding a tiger that has strayed into a human habitation?
(A) It should be immediately shot and neutralised on sight by local police personnel
(B) Local villagers should be authorized to capture the animal using traditional rope nets
(C) It should automatically and unconditionally be declared a man-eater within 24 hours
(D) It must be verified and monitored to push it back or tranquilize it safely

57. Consider the following statements regarding the declaration of a tiger as a 'man-eater':
I. Only the Chief Wildlife Warden (CWLW) of the state has the authority to declare a tiger a man-eater.
II. The decision must be based on a pattern of deliberate human stalking and killing, not accidental encounters.
III. NTCA guidelines suggest capturing and sending the man-eater to a zoo if relocation to the wild is impossible.
IV. Local Gram Panchayats can independently vote to declare a tiger a man-eater.
Which of the above statements are correct?
(A) I, II, and III only
(B) I, II, and IV only
(C) II, III, and IV only
(D) I, III, and IV only

58. In human-tiger conflict analysis, how is an "accidental encounter" differentiated from a "habitual man-eater" scenario?
(A) Accidental encounters exclusively occur during nighttime, whereas habitual man-eaters hunt strictly during daylight hours.
(B) Accidental encounters happen when a human unexpectedly stumbles upon a tiger protecting its kill or cubs.
(C) A tiger is classified as an accidental killer if it consumes the entire human body immediately after the encounter.
(D) Habitual man-eaters exclusively target and attack human individuals who are actively carrying weapons or tools.

59. What is the role of Primary Response Teams (PRTs) established at the village level near tiger reserves?
(A) To independently hunt down, track, and capture problem wild animals in conflict zones
(B) To manage crowd control, relay information, and assist forest staff in conflicts
(C) To directly calculate, authorize, and disburse ex-gratia compensation funds to victims
(D) To issue, evaluate, and approve regulated ecotourism and safari permits for reserves

60. Under the Wildlife (Protection) Act 1972, the term 'Critical Tiger Habitat' (CTH) corresponds to which zone of a Tiger Reserve?
(A) Core Zone
(B) Transition Zone
(C) Buffer Zone
(D) Tourism Zone

61. Which of the following is a mandatory condition for the Core Zone of a Tiger Reserve?

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(A) It must permit controlled rotational grazing of domestic village livestock throughout the year.
(B) It must mandatory host at least one major luxury government or private ecotourism resort facility.
(C) It must be kept inviolate and free from human settlements and biotic interference.
(D) It must regularly allow sustainable timber harvesting operations conducted by the forest department.

62. What is the primary management objective of the Buffer Zone in a Tiger Reserve?
(A) To establish an inviolate protected space strictly reserved for tiger breeding and cub rearing
(B) To completely prohibit all human entry and totally isolate the entire peripheral forest tract
(C) To clear designated forest patches to promote intensive commercial agricultural expansion
(D) To promote coexistence between wildlife and local human activities and secure livelihoods

63. What is the correct spatial hierarchy of a Tiger Reserve landscape, moving from the most protected central area to the outermost human-dominated area?
(A) Buffer Area → Core Area → Transition Area
(B) Core Area → Buffer Area → Transition Area
(C) Transition Area → Buffer Area → Core Area
(D) Core Area → Transition Area → Buffer Area

64. On whose recommendation does the State Government notify the Core or Critical Tiger Habitat of a Tiger Reserve?
(A) Gram Sabhas of all the adjoining local forest villages
(B) Expert Committee constituted for the purpose and the NTCA
(C) Union Ministry of Tourism and Culture Advisory Panel
(D) Animal Welfare Board of India and local NGOs

65. According to the comprehensive NTCA guidelines on tiger conservation and tourism, what is the maximum permissible area of the core zone that can be opened for regulated ecotourism?
(A) 10%
(B) 20%
(C) 50%
(D) 100%

66. Under current NTCA ecotourism guidelines, which type of tourism is explicitly discouraged in Tiger Reserves?
(A) High-density, exploitative resort-based mass tourism
(B) Regulated vehicular safaris along designated park tracks
(C) Guided nature walks within designated buffer area zones
(D) Community-based homestay tourism in peripheral villages

67. To ensure that local communities benefit from wildlife conservation, NTCA guidelines mandate the creation of which committee at the reserve level?
(A) Wildlife Poaching Committee
(B) Safari Assessment Committee
(C) Local Advisory Committee (LAC)
(D) Commercial Ecotourism Board

68. What is the current NTCA policy regarding the construction of new permanent tourist infrastructure (like hotels and resorts) inside the core zone of a tiger reserve?
(A) It is strictly prohibited.
(B) It is permitted if constructed with eco-friendly materials.
(C) It is allowed only for foreign tourists.
(D) It is allowed if 50% profits are shared with the government.

69. Why do NTCA guidelines emphasize shifting tourism pressures from the core zone to the buffer zone?
(A) Because wild tiger populations are exclusively found residing within peripheral buffer zones
(B) To maximize commercial revenues strictly intended for private resort owners and tour operators
(C) Because designated core forest areas possess no significant scenic beauty or landscape value
(D) To benefit local buffer communities and reduce disturbance to breeding tigers

70. Given below are two statements, one labeled as Assertion (A) and the other as Reason (R):
Assertion (A): The Wildlife Crime Control Bureau (WCCB) was established as a statutory multi-disciplinary body.
Reason (R): It was constituted under an amendment to the Wildlife (Protection) Act, 1972 to combat organized wildlife crime.

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Which of the following is correct?
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

71. Where is the national headquarters of the Wildlife Crime Control Bureau (WCCB) located?
(A) Dehradun
(B) Nagpur
(C) New Delhi
(D) Bhopal

72. In which year did the Wildlife Crime Control Bureau (WCCB) become operational following the amendment to the Wildlife (Protection) Act, 1972?
(A) 1973
(B) 1992
(C) 2007
(D) 2014

73. Which of the following operations was launched by the WCCB specifically to curb the illegal trade in live turtles and tortoises?
(A) Operation Save Kurma
(B) Operation Thunderbird
(C) Operation Wildnet
(D) Operation Softgold

74. Which of the following correctly describes a core function of the WCCB?
(A) Regulating domestic cattle trade and livestock movement across interstate borders
(B) Collecting and collating intelligence related to organized wildlife crime
(C) Issuing official permits and licenses for legal commercial hunting of wild tigers
(D) Drafting and publishing the quinquennial All-India Tiger Estimation official report

75. The WCCB functions under the administrative control of which central ministry?
(A) Ministry of Home Affairs
(B) Ministry of Environment, Forest and Climate Change
(C) Ministry of Defence
(D) Ministry of External Affairs

76. What is the primary driver of the illegal international trade and poaching of wild tigers?
(A) Demand for tiger parts in Traditional Chinese Medicine (TCM)
(B) Demand for tiger meat as a popular staple food across South Asia
(C) Demand for wild live tigers to populate North American public zoos
(D) Need for strong tiger teeth to manufacture industrial cutting tools

77. Which parts of the tiger are most predominantly trafficked in the illegal global wildlife market?
(A) Hooves and horns
(B) Feathers and scales
(C) Skin, bones, and claws
(D) Tusks and ivory

78. Consider the following statements regarding the Special Tiger Protection Force (STPF):
I. It is a dedicated armed force raised to protect tigers in vulnerable reserves.
II. 100% central assistance is provided to states for raising and equipping the STPF.
III. STPF personnel have no authority to patrol inside the core zones.
Which of the above statements is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II and III

79. Which geographical route is historically most notorious for the transboundary smuggling of tiger derivatives out of India?
(A) Maritime shipping routes across the Arabian Sea towards Western ports
(B) Direct air cargo flights departing from southern India to Australia
(C) Porous land borders along the Himalayas into Nepal, Tibet, and China
(D) Overland desert routes across the borders of Rajasthan into Pakistan

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80. Financial assistance for the deployment of the Special Tiger Protection Force (STPF) in tiger reserves is routed through which scheme?
(A) Project Elephant
(B) Project Tiger
(C) CAMPA Funds exclusively
(D) National Afforestation Programme

81. Which international non-governmental organization, a joint programme of WWF and IUCN, specializes in monitoring the illegal wildlife trade, including tiger trafficking?
(A) Greenpeace
(B) Amnesty International

(C) CITES Secretariat
(D) TRAFFIC

82. Which of the following elephant species/ subspecies has historically faced the highest volume of poaching for ivory globally?
(A) African Savanna Elephant
(B) Asian Elephant
(C) Indian Elephant
(D) Sumatran Elephant

83. In which year did CITES enforce a historic global ban on the international commercial trade of African elephant ivory?
(A) 1973
(B) 1989
(C) 2002
(D) 2016

84. The term "blood ivory" is often used in international conservation circles to refer to:
(A) Poached ivory that finances armed conflicts and insurgencies
(B) Ivory naturally discolored and stained red by mineral-rich soil
(C) Legally harvested ivory from elephants dying of natural causes
(D) Synthetic artificial ivory manufactured in chemical laboratories

85. ETIS is a comprehensive information system that tracks illegal trade in ivory and other elephant products. What does ETIS stand for?
(A) Endangered Tusker Investigation Squad
(B) Electronic Tracking of Indian Species
(C) Ecosystem Transformation and Ivory Seizure
(D) Elephant Trade Information System

86. Match the wildlife conservation databases/tools in List I with their specific focus in List II**:**
List I: (Database / Tool)
P. MIKE
Q. ETIS
R. M-STrIPES
S. RhoDIS
List II: (Focus)
1. Tracking illegal ivory seizures globally
2. Monitoring illegal killing of elephants at site level
3. DNA indexing of Rhinos
4. Ecological monitoring in Tiger Reserves
(A) P-1, Q-2, R-3, S-4
(B) P-2, Q-1, R-4, S-3
(C) P-4, Q-3, R-2, S-1
(D) P-2, Q-4, R-1, S-3

87. In India, under which legislation is the domestic trade, possession, and carving of Indian elephant ivory strictly prohibited?
(A) Antiquities and Art Treasures Act, 1972
(B) Prevention of Cruelty to Animals Act, 1960
(C) Wildlife (Protection) Act, 1972
(D) Customs Act, 1962

88. What does the acronym CITES stand for?
(A) Council for International Tracking of Exotic Species
(B) Committee for Illegal Trade Eradication System
(C) Centre for Indian Tiger and Elephant Sanctuaries
(D) Convention on International Trade in Endangered Species of Wild Fauna and Flora

89. Species threatened with extinction that are completely banned from international commercial trade are listed under which Appendix of CITES?
(A) Appendix I
(B) Appendix II
(C) Appendix III
(D) Appendix IV

90. In which year did India become a formal party to CITES by depositing its instrument of ratification?
(A) 1973
(B) 1976
(C) 1982
(D) 1991

91. Both the Tiger (Panthera tigris) and the Asian Elephant (Elephas maximus) are placed in which Appendix of CITES?
(A) Appendix I
(B) Appendix II
(C) Appendix III
(D) They are not listed in CITES

92. Consider the following statements regarding the implementation of CITES in India:
I. The Director of Wildlife Preservation acts as the CITES Management Authority for India.
II. The Wildlife Institute of India serves as one of the CITES Scientific Authorities.
III. CITES regulations in India are enforced through the Customs Act and the Wildlife (Protection) Act.

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IV. CITES permits domestic hunting of Appendix I species within India.

Which of the above statements are correct?
(A) I, II, and III only
(B) I, II, and IV only
(C) II, III, and IV only
(D) I, III, and IV only

93. What is the main decision-making body of CITES, which meets every two to three years to review and amend the appendices?
(A) The General Assembly (GA)
(B) The Security Council
(C) The Conference of the Parties (CoP)
(D) The Secretariat of the UN

94. Prior to the Wildlife (Protection) Amendment Act 2022, both tigers and elephants were provided the highest level of protection by being listed in which schedule?
(A) Schedule I
(B) Schedule II
(C) Schedule III
(D) Schedule V

95. Following the Wildlife (Protection) Amendment Act 2022, the schedules have been rationalized. In the new structure, tigers and elephants continue to receive absolute protection under which schedule?
(A) Schedule I
(B) Schedule II
(C) Schedule III
(D) Schedule IV (CITES species only)

96. Under the Wildlife (Protection) Act, 1972, what is the minimum term of imprisonment for a first-time conviction for hunting a Schedule I animal inside a Tiger Reserve?
(A) 1 year
(B) 3 years
(C) 7 years
(D) 10 years

97. How does the Wildlife (Protection) Act, 1972 legally treat captive elephants?
(A) As domestic livestock completely exempt from all regulatory provisions of the Act
(B) As contraband property that is completely illegal to hold under any circumstances
(C) As communal property requiring no official registration or government documentation
(D) As wildlife property requiring an ownership declaration and valid certificate

98. Consider the following legal classifications under the newly amended Wildlife (Protection) Act 2022:
I. Species under CITES Appendices (Schedule IV)
II. Animal species with highest protection (Schedule I)
III. Animal species with lesser protection (Schedule II)

Which of the following represents the correct sequence when arranged from the highest protection status to the lowest/specific trade status in terms of Schedule numbering?
(A) II, III, I
(B) I, II, III
(C) III, II, I
(D) II, I, III

99. The Wildlife (Protection) Act strictly prohibits dealing in trophy and animal articles derived from Schedule I species. Which of the following qualifies as an "animal article"?
(A) An article made entirely from synthetic plastics mimicking tiger skin
(B) An article made from captive-bred domestic sheep
(C) A carved ivory figurine made from an Asian elephant's tusk
(D) A wooden carving of an elephant

100. What is the conservation status of the Tiger (Panthera tigris) globally on the IUCN Red List of Threatened Species?
(A) Least Concern
(B) Near Threatened
(C) Endangered
(D) Critically Endangered

101. What is the conservation status of the Asian Elephant (Elephas maximus) on the IUCN Red List?
(A) Vulnerable
(B) Endangered
(C) Critically Endangered
(D) Extinct in the Wild

102. In 2021, the IUCN split the African elephant into two species with different Red List statuses. The African Forest Elephant is listed as Critically Endangered, whereas the African Savanna Elephant is listed as:
(A) Least Concern
(B) Near Threatened
(C) Endangered

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(D) Extinct

103. Which of the following is a primary criterion used by the IUCN to evaluate whether a species like the tiger should be classified as 'Endangered'?
(A) Its overall aesthetic appeal and popularity among international tourists
(B) The total number of accredited public zoos currently housing the species
(C) Severe reduction in population size and geographic range
(D) The animal's position as an apex predator in the food chain

104. Which global organization is responsible for compiling and publishing the Red List of Threatened Species?
(A) United Nations Environment Programme (UNEP)
(B) World Wide Fund for Nature (WWF)
(C) Global Environment Facility (GEF)
(D) International Union for Conservation of Nature (IUCN)

105. Given below are two statements, one labeled as Assertion (A) and the other as Reason (R):
Assertion (A): A species listed as 'Endangered' on the IUCN Red List is automatically placed in Appendix I of CITES.
Reason (R): IUCN and CITES are distinct bodies; IUCN assesses biological risk while CITES specifically regulates international trade.
Which of the following is correct?
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

106. Which Tiger Reserve in Madhya Pradesh witnessed a highly successful tiger reintroduction and rehabilitation programme after its local tiger population went extinct in 2009?
(A) Pench Tiger Reserve
(B) Panna Tiger Reserve
(C) Satpura Tiger Reserve
(D) Sanjay-Dubri Tiger Reserve

107. During tiger translocation, what is the purpose of "soft release" protocol?
(A) Releasing the tiger immediately into the open forest straight from the transport cage
(B) Releasing the tiger into an acclimatization enclosure before full release
(C) Surgically removing or blunting the tiger's canine teeth before releasing it into the wild
(D) Releasing only juvenile tiger cubs into the habitat without adult maternal supervision

108. Which Indian Tiger Reserve was the first to successfully pioneer the reintroduction of tigers via air-lifting from another reserve in 2008?
(A) Sariska Tiger Reserve
(B) Corbett Tiger Reserve
(C) Dudhwa Tiger Reserve
(D) Buxa Tiger Reserve

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109. What is a crucial genetic criterion considered before relocating a tiger from a source population to a new habitat?
(A) Ensuring the tiger belongs to a different subspecies to create a genetic hybrid
(B) Ensuring the tiger exhibits leucism or white coloration to boost tourist appeal
(C) Ensuring genetic compatibility and similar landscape adaptability
(D) Ensuring the animal has no functional canine teeth to prevent hunting accidents

110. Which body issues the comprehensive Standard Operating Procedure (SOP) for the active management and rehabilitation of tigers in India?
(A) Wildlife Trust of India
(B) State Police Departments
(C) Animal Welfare Board
(D) National Tiger Conservation Authority (NTCA)

111. To create inviolate spaces for tiger rehabilitation in core areas, the government offers a voluntary village relocation package. What is the current standard financial incentive package provided per family?
(A) Rs. 5 Lakh
(B) Rs. 10 Lakh
(C) Rs. 15 Lakh
(D) Rs. 25 Lakh

112. Consider the following statements regarding the Indian Rhino Vision 2020:
I. The goal was to achieve a wild population of at least 3,000 Greater One-horned Rhinos in Assam by 2020.
II. It involved translocating rhinos from Kaziranga and Pabitora to other protected areas like Manas National Park.

III. The project was declared a failure as the rhino population drastically decreased.

Which of the above statements is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II and III

113. What is the current IUCN Red List conservation status of the Greater One-horned Rhinoceros found in India?
(A) Least Concern
(B) Vulnerable
(C) Endangered
(D) Critically Endangered

114. Which flagship conservation programme was launched by India in 2009 to protect the high-altitude apex predator of the Himalayas?
(A) Project Snow Leopard
(B) Project Clouded Leopard
(C) Project Himalayan Wolf
(D) Project Red Panda

115. The Asiatic Lion Conservation Project is exclusively focused on managing the last surviving wild population of Asiatic lions located in which state?
(A) Madhya Pradesh
(B) Rajasthan
(C) Gujarat
(D) Maharashtra

116. Which Indian National Park holds the distinction of harbouring the world's largest population of the Greater One-horned Rhinoceros?
(A) Kaziranga National Park
(B) Dudhwa National Park
(C) Jaldapara National Park
(D) Manas National Park

117. What is the primary purpose of the Rhino DNA Index System (RhoDIS) adopted in India?
(A) To successfully clone extinct rhino species in specialized research facilities
(B) To artificially inseminate endangered captive rhinos across various global zoos
(C) To map the complete evolutionary history and divergence of African rhino species
(D) To build a DNA database tracing poached horns to individual rhinos

118. In wildlife telemetry, what does the abbreviation VHF stand for in the context of radio collars fitted on tigers?
(A) Variable Habitat Frequency
(B) Very High Frequency
(C) Visual Habitat Finder
(D) Virtual Home-range Flasher

119. Match the wildlife tracking technologies in List I with their functional characteristics in List II**:**

List I: (Technology)
P. VHF Collar
Q. GPS Collar
R. Argos Satellite Collar
S. GSM/Cellular Collar

List II: (Functional Characteristic)
1. Transmits coordinates via mobile networks
2. Uses satellites to transmit location globally without cellular networks
3. Requires a researcher on the ground with an antenna to detect beeps
4. Logs exact coordinates on board but may need retrieval or remote download

(A) P-3, Q-4, R-2, S-1
(B) P-1, Q-2, R-3, S-4
(C) P-4, Q-3, R-1, S-2
(D) P-3, Q-1, R-2, S-4

120. According to scientific guidelines for wildlife telemetry, the weight of a radio collar should generally not exceed what percentage of the animal's body weight?
(A) 1%
(B) 3 to 5%
(C) 10 to 15%
(D) 20%

121. Modern GPS collars for wildlife are often equipped with a "drop-off" mechanism. What is its purpose?
(A) To safely detach the collar via remote command or timer, preventing lifelong burden
(B) To automatically trigger and inject a tranquilizer dose if the animal approaches human settlements
(C) To drop highly visible neon marker flags along the forest path for field researchers to track manually
(D) To automatically eject the depleted lithium battery pack when power levels drop below critical thresholds

122. How does satellite tracking of problem elephants significantly aid in mitigating human-wildlife conflict?
(A) By delivering a mild electrical shock

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to immobilize the elephant whenever it approaches agricultural fields
(B) By using geofencing to send automated SMS alerts when elephants approach human habitations
(C) By activating a high-powered holographic projector that displays images of fire to deter the animal
(D) By emitting high-decibel acoustic deterrent alarms directly from the collar when entering villages

123. Which drug combination is most commonly used by forest veterinarians in India to safely immobilize (tranquilize) a tiger for radio-collaring?
(A) Paracetamol and Ibuprofen
(B) Xylazine and Ketamine
(C) Morphine and Atropine
(D) Chloroform and Ether

124. The camera trap method relies on which unique morphological feature to individually identify wild tigers?
(A) Unique stripe patterns on their flanks
(B) Tail length
(C) Canine structure
(D) Eye colour

125. Why are camera traps in tiger surveys typically deployed in pairs facing each other on opposite sides of a forest trail?
(A) To serve as an immediate technical backup in case one camera suffers battery failure or theft
(B) To accurately measure the body width and shoulder height of the passing animal in real time
(C) To photograph both flanks of the tiger simultaneously for accurate identification
(D) To illuminate the trail with a crossfire of camera flashes to freeze high-speed movement

126. Most modern camera traps used in wildlife censuses are triggered by an animal passing in front of the lens. What type of sensor do they primarily use?
(A) Radar sensors
(B) Pressure pads on the ground
(C) Acoustic sensors detecting roars
(D) Passive Infrared (PIR) sensors detecting heat and motion

127. Which statistical methodology forms the mathematical foundation of estimating total tiger populations from camera trap photos of uniquely identifiable individuals?
(A) Chi-Square Test
(B) Standard Deviation Plotting
(C) Capture-Mark-Recapture (CMR)
(D) Monte Carlo Simulation

128. Consider the following statements regarding the advantages of camera traps over the traditional pugmark method:
I. Camera trapping provides irrefutable photographic evidence of an individual animal.
II. It eliminates the subjective human error associated with tracing paw prints on glass.
III. It automatically identifies the gender of every tiger via infrared scanning.
IV. It is useful for surveying nocturnal and cryptic carnivore species.
Which of the above statements are correct?
(A) I, II, and III only
(B) I, II, and IV only
(C) II, III, and IV only
(D) I, III, and IV only

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129. What is the name of the AI-powered software utilized by the NTCA and WII to process millions of camera trap images and segregate photos of tigers and leopards from other animals?
(A) TIGER-SCAN
(B) PHOTO-MATCH
(C) AI-WILD
(D) CaTRAT (Camera Trap Data Repository and Analysis Tool)

130. Under the statutory provisions, what is the standard operating duration of a Tiger Conservation Plan (TCP) before it requires comprehensive revision and renewal?
(A) 5 years
(B) 10 years
(C) 15 years
(D) 20 years

131. The preparation and implementation of a Tiger Conservation Plan is a statutory requirement under which section of the Wildlife (Protection) Act, 1972?
(A) Section 9
(B) Section 27
(C) Section 38V
(D) Section 51

132. A standard Tiger Conservation Plan structurally comprises three main parts. They manage the Core area, the Buffer area, and which other critical aspect?
(A) Adjoining areas and wildlife corridors connecting the reserve
(B) Public zoological parks located within the state capital region
(C) International border checkpoints monitoring wildlife trade
(D) Marine sanctuaries and coastal ecological management zones

133. Which of the following represents the correct logical sequence of steps involved in the preparation and finalization of a Tiger Conservation Plan (TCP)?
(A) Drafting by Field Director → Approval by State CWLW → Final Approval by NTCA
(B) Final Approval by NTCA → Drafting by Field Director → Approval by State CWLW
(C) Approval by State CWLW → Final Approval by NTCA → Drafting by Field Director
(D) Drafting by NTCA → Approval by Field Director → Final Approval by State CWLW

134. In the administrative hierarchy of the State Forest Department, who holds the ultimate statutory responsibility as the nodal officer for wildlife management in the state, including TCP endorsement?
(A) Divisional Forest Officer (DFO)
(B) Chief Wildlife Warden (CWLW)
(C) Forest Guard
(D) Veterinary Officer

135. In territorial forest divisions overlapping with tiger reserve buffers, the standard 'Working Plan' for forest management must be aligned and integrated with which document?
(A) The State Industrial Policy
(B) The National Highway Plan
(C) The Tiger Conservation Plan (TCP)
(D) The Municipal Master Plan

136. What is the primary objective of notifying an Eco-Sensitive Zone (ESZ) around a protected area like a Tiger Reserve?
(A) To convert surrounding peripheral land into an exclusive residential zone for forest officials
(B) To formally demarcate unregulated hunting zones for regulated sport and wildlife management
(C) To establish heavy manufacturing industries safely away from major metropolitan cities
(D) To act as a 'shock absorber' by regulating development activities in the vicinity

137. Given below are two statements, one labeled as Assertion (A) and the other as Reason (R):
Assertion (A): Large-scale commercial mining is strictly prohibited within the demarcated wildlife corridors and Eco-Sensitive Zones of Tiger Reserves.
Reason (R): Mining activities cause irreversible habitat fragmentation, noise, and block historical movement paths of mega-herbivores and predators.
Which of the following is correct?
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

138. Which major structural intervention was built on National Highway 44 passing through the Pench Tiger Reserve corridor to allow safe passage for tigers and other wildlife?
(A) An underground metro train
(B) Animal underpasses and overpasses with acoustic barriers
(C) A concrete wall completely blocking animal movement
(D) Solar electric fences along the highway

139. In the land-use planning of buffer areas, which of the following activities is actively promoted to support both local economy and conservation?
(A) Chemical-intensive commercial cash crop farming and widespread monoculture plantations
(B) Eco-friendly agriculture, agro-forestry, and sustainable forest produce extraction
(C) Construction and operation of large-scale cement manufacturing factories
(D) Commercial open-cast coal mining and heavy mineral extraction projects

140. Which legal category under the Wildlife (Protection) Act allows private landholders or communities to voluntarily offer their land adjoining a sanctuary for wildlife protection, thus securing a corridor?
(A) Community Reserve
(B) Conservation Reserve

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(C) Biosphere Reserve
(D) National Park

141. The shift from managing isolated Tiger Reserves to managing a network of protected areas, corridors, and buffer zones is termed in conservation science as:
(A) Captive Breeding Management
(B) Zoo Enclosure Expansion
(C) Landscape-level Conservation Strategy
(D) Micro-habitat Manipulation

142. According to the All India Tiger Estimation report released in 2023, what is the estimated average tiger population in India for the year 2022?
(A) 1,411
(B) 2,967
(C) 3,682
(D) 5,000

143. Which state recorded the highest number of tigers in the 2022 All India Tiger Estimation?
(A) Karnataka
(B) Uttarakhand
(C) Madhya Pradesh
(D) Maharashtra

144. Consider the following statements regarding the tiger population in Uttar Pradesh as per the 2022 census:
I. The total estimated tiger population in Uttar Pradesh has crossed 200.
II. Dudhwa Tiger Reserve holds the largest share of the state's tiger population.
III. There was a recorded decline in the tiger population in UP compared to the 2018 census.
Which of the above statements is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II and III

145. As of 2023, India is home to approximately what percentage of the world's total wild tiger population?
(A) 25%
(B) 50%
(C) 75%
(D) 95%

146. Which landscape complex in India holds the highest number of tigers geographically, according to the 2022 census?
(A) Central Indian Highlands and Eastern Ghats landscape
(B) Western Ghats landscape
(C) Shivalik Hills and Gangetic Plains landscape
(D) Sundarbans landscape

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147. Which individual Tiger Reserve in India supports the maximum number of tigers?
(A) Bandipur Tiger Reserve
(B) Kaziranga Tiger Reserve
(C) Jim Corbett Tiger Reserve
(D) Ranthambore Tiger Reserve

148. On which date is International Tiger Day celebrated globally every year to raise awareness for tiger conservation?
(A) June 5
(B) July 29
(C) August 12
(D) October 4

149. The declaration of International Tiger Day was originally made at which historic summit held in 2010?
(A) Rio Earth Summit
(B) Kyoto Protocol Summit
(C) Johannesburg Summit
(D) St. Petersburg Tiger Summit

150. Match the important environment and wildlife days in List I with their respective dates in List II:
List I: (Environment / Wildlife Day)
P. World Environment Day
Q. International Tiger Day
R. World Elephant Day
S. World Wildlife Day
List II: (Date)
1. March 3
2. June 5
3. July 29
4. August 12
(A) P-2, Q-3, R-4, S-1
(B) P-1, Q-2, R-3, S-4
(C) P-4, Q-3, R-2, S-1
(D) P-2, Q-4, R-1, S-3

151. What was the explicit global goal set by the TX2 campaign initiated by the WWF and tiger-range countries in 2010?
(A) To breed tigers strictly in captivity
(B) To introduce tigers to the African continent by 2022
(C) To double the global population of wild

tigers by the year 2022
(D) To mandate that every country must have exactly two tiger reserves

152. Which intergovernmental international body, headquartered in New Delhi, is exclusively dedicated to the conservation of wild tigers?
(A) United Nations Security Council
(B) International Monetary Fund
(C) World Health Organization
(D) Global Tiger Forum (GTF)

153. What does CA|TS stand for in the context of global standard assessment for tiger reserves?
(A) Conservation Assured | Tiger Standards
(B) Central Authority for Tiger Sanctuaries
(C) Committee for Animal and Tiger Security
(D) Captive Animal Tracking System

154. The Terai Elephant Reserve (TER) in Uttar Pradesh integrates forest areas primarily belonging to which two tiger reserves?
(A) Amangarh and Ranipur
(B) Dudhwa and Pilibhit
(C) Corbett and Rajaji
(D) Panna and Bandhavgarh

155. According to official state census estimates, the wild elephant population in Uttar Pradesh is approximately in what range?
(A) Less than 50
(B) Around 350
(C) Over 1,000
(D) Over 5,000

156. What is the major threat to the elephant population traversing the Shivalik-Bijnor landscape in western Uttar Pradesh?
(A) Infrastructure development and fragmentation along the UP-Uttarakhand border
(B) High frequency of severe winter snow avalanches across mountain valley passes
(C) Periodic coastal flooding and sea level rise impacting forested tracts
(D) Organized commercial poaching targeting elephant herds for meat consumption

157. A significant portion of the wild elephant population observed in northern Uttar Pradesh (Bijnor and Saharanpur divisions) exhibits what kind of behavioural pattern?
(A) They are strictly endemic to low-lying plains and never migrate outside state borders
(B) They are highly domesticated animals that reside permanently within human villages
(C) They are migratory, moving seasonally between Uttarakhand and Uttar Pradesh forests
(D) They undergo deep biological hibernation during winter months every year

158. Project Elephant implementation in Uttar Pradesh focuses prominently on mitigating human-elephant conflict in which specific region?
(A) The Bundelkhand plateau
(B) The Vindhyan range of Sonbhadra
(C) The central Doab region
(D) The Terai and Bhabar tracts

159. Consider the following statements regarding the Terai Elephant Reserve (TER) in Uttar Pradesh:
I. It is the 33rd Elephant Reserve of India.
II. It covers an area of over 3,000 sq km.
III. Its notification ensures that both Project Tiger and Project Elephant concurrently operate in the Dudhwa-Pilibhit landscape.
IV. It was entirely funded by the World Bank.
Which of the above statements are correct?
(A) I, II, and III only
(B) I, II, and IV only
(C) II, III, and IV only
(D) I, III, and IV only

160. Where is India's first specialized Elephant Rescue and Care Centre, established jointly by the UP Forest Department and Wildlife SOS, located?
(A) Lucknow
(B) Mathura
(C) Varanasi
(D) Gorakhpur

161. In 2023, India celebrated the 50th anniversary of Project Tiger. In which city was the mega commemorative event inaugurated?
(A) Dehradun
(B) New Delhi
(C) Bhopal
(D) Mysuru

162. During the 50th-anniversary event of Project Tiger, a vision document for future tiger conservation was released. What is the title of this document?
(A) Amrit Kaal Ka Tiger Vision
(B) Project Tiger: 2050
(C) Tiger First Vision
(D) Swachh Jungle Abhiyan

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163. The International Big Cats Alliance (IBCA) was launched by India to focus on the conservation of how many major big cat species globally?
(A) 3
(B) 5
(C) 7
(D) 9

164. To commemorate 30 years of Project Elephant, the national 'Gaj Utsav 2023' was inaugurated by the President of India in which National Park?
(A) Kaziranga National Park
(B) Dudhwa National Park
(C) Periyar National Park
(D) Bandipur National Park

165. Given below are two statements, one labeled as Assertion (A) and the other as Reason (R):
Assertion (A): Maintaining genetic connectivity between fragmented tiger populations requires viable forest corridors.
Reason (R): Isolated tiger populations in small reserves suffer from inbreeding depression, leading to long-term local extinctions.
Which of the following is correct?
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

166. In the 5th cycle of the Management Effectiveness Evaluation (MEE) of Tiger Reserves (2022), which Tiger Reserve ranked first in India?
(A) Bandipur Tiger Reserve
(B) Periyar Tiger Reserve
(C) Kanha Tiger Reserve
(D) Similipal Tiger Reserve

167. In the 2022 Management Effectiveness Evaluation (MEE) report of Tiger Reserves, into which performance category was Uttar Pradesh's Dudhwa Tiger Reserve placed?
(A) Poor
(B) Fair
(C) Good
(D) Very Good

168. The Wildlife Institute of India (WII), a key partner in tiger and elephant population estimations, is headquartered in:
(A) Nagpur
(B) Jabalpur
(C) Shillong
(D) Dehradun

169. The Wildlife Crime Control Bureau (WCCB) closely coordinates with which international police organization's Environmental Security Programme to curb cross-border trafficking?
(A) Interpol
(B) Europol
(C) UN Peacekeepers
(D) NATO

170. Ultimately, the long-term success of both Project Tiger and Project Elephant depends most heavily upon:
(A) Complete elimination of all apex carnivores to permanently safeguard herbivore populations
(B) Ensuring active participation, livelihood security, and support of local communities
(C) Constructing high physical concrete perimeter walls around all national parks and reserves
(D) Relocating all wild megafauna into heavily secured and managed zoological facilities

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ANSWERS

1. (B) Jim Corbett National Park
Project Tiger was officially launched on April 1, 1973, by the Government of India during the tenure of Prime Minister Indira Gandhi. The flagship conservation initiative was inaugurated at Jim Corbett National Park in Uttarakhand. Its primary objective was to halt the dwindling populations of Bengal tigers and preserve their natural ecological habitats across designated national reserves.

2. (D) 100% central funding for core areas and 50% for buffer areas
Project Tiger operates as a Centrally Sponsored Scheme providing financial assistance to tiger range states. Under the standard funding structure for normal states, non-recurring and recurring expenditure for core areas receives full financial backing of one hundred percent from the central government, while buffer areas receive fifty percent central assistance alongside state government contributions.

3. (A) To ensure the maintenance of a viable population of tigers in their natural habitats
The primary ecological objective behind launching Project Tiger in 1973 was ensuring the preservation and maintenance of a viable population of Bengal tigers within their natural wild habitats. The program focuses on maintaining functional ecosystem dynamics, protecting apex predator food webs, and mitigating environmental degradation across selected forest landscapes to safeguard long-term biodiversity.

4. (C) 9
When Project Tiger was officially launched in 1973–74, nine tiger reserves were initially established across diverse ecological landscapes in India. These original reserves encompassed key wildlife areas including Corbett, Kanha, Ranthambore, Bandipur, and Sundarbans, covering a total area of approximately 9,115 square kilometers designed to safeguard declining wild tiger populations nationwide.

5. (A) Ministry of Environment, Forest and Climate Change
The Ministry of Environment, Forest and Climate Change serves as the central administrative and nodal ministry responsible for overseeing Project Tiger in India. Through the National Tiger Conservation Authority, the ministry administers financial allocations, formulates national wildlife conservation policies, monitors reserve management effectiveness, and coordinates with state forest departments to protect wild tiger populations.

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6. (D) The local extinction of tigers in Sariska Tiger Reserve reported in 2005
The sudden local extinction of tigers in Rajasthan's Sariska Tiger Reserve, exposed around early 2005 due to widespread poaching, served as a major catalyst for administrative reforms. This ecological crisis prompted the Prime Minister to establish the Tiger Task Force, which subsequently recommended setting up the National Tiger Conservation Authority as a statutory oversight body.

7. (C) 1992
Project Elephant was launched by the Ministry of Environment and Forests in February 1992 to ensure the long-term survival of wild Asian elephants in their natural habitats. The Centrally Sponsored Scheme provides financial, technical, and scientific support to major elephant-bearing states for habitat management, corridor protection, and mitigating human-elephant conflicts across designated ranges.

8. (C) To strictly promote commercial trading of captive elephants
Project Elephant focuses on habitat restoration, securing ecological corridors, mitigating human-animal conflict, and improving captive elephant welfare. The central government strictly prohibits commercial trading of captive elephants under Indian wildlife legislation. Consequently, commercial trade is excluded from conservation objectives, ensuring protection remains aligned with the Wildlife Protection Act and international conservation standard guidelines.

9. (D) Monitoring of Illegal Killing of Elephants
The MIKE programme stands for Monitoring of Illegal Killing of Elephants, an international initiative established under CITES resolution at CoP-10. Operating within designated elephant landscapes across South Asia, including India, the program tracks long-term trends in elephant poaching, measures illegal mortality patterns, and provides critical data to enhance enforcement strategies and conservation policies.

10. (A) The Elephant Task Force (ETF)
The landmark report titled "Gajah: Securing the Future for Elephants in India" was submitted in 2010 by the Elephant Task Force constituted by the Ministry of Environment and Forests. Chaired by Mahesh Rangarajan, the task force provided comprehensive recommendations on landscape-level management, establishing elephant reserves legally, strengthening corridors, and mitigating human-elephant conflict nationwide.

11. (B) Haathi Mere Saathi
The Ministry of Environment and Forests, in partnership with the Wildlife Trust of India, launched the nationwide public awareness campaign titled "Haathi Mere Saathi" during the Elephant-8 Summit in 2011. The campaign aimed to generate public support, raise awareness among local communities, and foster positive co-existence between humans and wild elephants across critical ranges.

12. (C) 2010
The Government of India officially declared the Asian Elephant as the National Heritage Animal of India in October 2010 following recommendations made by the Elephant Task Force. This prestigious designation aims to raise public awareness, elevate conservation priority, and ensure stronger legal and ecological safeguards for wild elephant populations across their historical ranges.

13. (A) Nagarjunasagar Srisailam Tiger Reserve
Nagarjunasagar Srisailam Tiger Reserve, located in Andhra Pradesh across the Nallamala forest range, is geographically the largest tiger reserve in India by total surface area. Spanning over 3,296 square kilometers, this vast landscape encompasses diverse deciduous forests, rugged terrain, and rich riverine ecosystems essential for sustaining megaherbivores, carnivores, and associated regional biodiversity.

14. (A) I and II only
Bor Tiger Reserve in Maharashtra is recognized as one of India's smallest tiger reserves by geographical spread, while Namdapha Tiger Reserve in Arunachal Pradesh features high-elevation mountain terrain habitat. Neither Punjab nor Haryana contains any notified tiger reserves, making statement three incorrect while confirming the historical and geographical accuracy of the first two statements.

15. (D) Madhya Pradesh
Madhya Pradesh holds the distinction of having the highest number of officially notified tiger reserves in India, earning the state its title as the Tiger State. Key reserves located here include Kanha, Bandhavgarh, Pench, Panna, Satpura, Sanjay-Dubri, and Veerangana Durgavati, providing vast interconnected forest landscapes that support thriving Bengal tiger populations.

16. (C) Madhya Pradesh
Veerangana Durgavati Tiger Reserve was officially notified as the seventh tiger reserve of Madhya Pradesh in 2023. Encompassing forested areas across Damoh, Sagar, and Narsinghpur districts, this reserve protects critical tiger habitats and wildlife corridors, particularly facilitating wildlife movement and ecological connectivity between the Nauradehi and Durgavati wildlife sanctuaries within central India.

17. (B) Pench Tiger Reserve
Pench Tiger Reserve is a notable transboundary protected landscape spanning across the contiguous borders of Madhya Pradesh and Maharashtra in Central India. Named after the Pench River flowing north to south through the forest, this reserve protects crucial teak and mixed deciduous habitats that support vital tiger, leopard, and ungulate wildlife populations.

18. (C) 54
By mid-2023, India had expanded its network of protected areas under Project Tiger to encompass 54 officially notified tiger reserves. Dholpur-Karauli in Rajasthan was approved as the 54th reserve. These designated reserves collectively cover more than 75,000 square kilometers, forming a critical national conservation network managed under the statutory guidance of NTCA.

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19. (A) P-3, Q-4, R-1, S-2
In Uttar Pradesh, Dudhwa Tiger Reserve lies primarily in Lakhimpur Kheri district, Pilibhit Tiger Reserve spans across Pilibhit district, Amangarh Tiger Reserve is situated within Bijnor district as a buffer area, and Ranipur Tiger Reserve was established in Chitrakoot district. Mapping these reserves correctly aligns each designated tiger habitat with its corresponding administrative district.

20. (C) Jim Corbett National Park
Amangarh Tiger Reserve in the Bijnor district of Uttar Pradesh was originally created as an administrative buffer zone for Jim Corbett National Park. When Uttarakhand was carved out of Uttar Pradesh in 2000, Corbett went to Uttarakhand, leaving Amangarh in Uttar Pradesh, which was subsequently notified as a distinct tiger reserve landscape.

21. (B) 1987-88
Dudhwa National Park, located in the humid Terai belt of Lakhimpur Kheri, was brought under the Project Tiger framework during 1987–88 to establish the broader Dudhwa Tiger Reserve. This conservation zone later integrated Kishampur Wildlife Sanctuary and Katarniaghat Wildlife Sanctuary to preserve critical habitats for tigers, Asian elephants, and swamp deer.

22. (D) Pilibhit Tiger Reserve
Pilibhit Tiger Reserve in Uttar Pradesh was awarded the prestigious international TX2 award in 2020 for doubling its tiger population in a record timeframe well ahead of the global target. The reserve's population grew from twenty-five tigers in 2014 to sixty-five in 2018, demonstrating effective habitat management and community protection efforts.

23. (B) Bundelkhand
Ranipur Tiger Reserve is geographically situated in the Chitrakoot district within the dry deciduous forest landscape of the Bundelkhand region in Uttar Pradesh. Approved as the state's fourth tiger reserve in 2022, Ranipur provides vital shelter, prey base, and ecological corridor connectivity for transient tiger populations migrating from nearby Panna Tiger Reserve.

24. (C) Mohana and Suhel
The Dudhwa Tiger Reserve landscape in northern Uttar Pradesh is deeply influenced by hydrological systems, with the Mohana and Suhel rivers flowing along its northern and southern boundaries. These watercourses form an extensive network of marshes, oxbow lakes, and grasslands that sustain the diverse aquatic and terrestrial biodiversity of the Terai ecosystem.

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25. (B) 2014
The Pilibhit forest division in Uttar Pradesh was officially notified as a Tiger Reserve in June 2014 under the provisions of the Wildlife Protection Act. Covering over eight hundred square kilometers along the Indo-Nepal border, this reserve comprises rich sal forests, tall Terai grasslands, and riverine ecosystems vital for sustaining wild carnivores.

26. (B) I, II, and IV only
Dudhwa Tiger Reserve lies along the Indo-Nepal border, Amangarh is situated in Bijnor district, and the Terai corridor connects Dudhwa with Pilibhit tiger populations. However, Ranipur was notified much later in 2022, whereas Dudhwa was Uttar Pradesh's first tiger reserve, making statement three incorrect while validating all remaining geographic and ecological statements.

27. (C) 33
By the end of 2022, India had notified a total of thirty-three Elephant Reserves across major elephant-bearing states under Project Elephant. The creation of the Terai Elephant Reserve in Uttar Pradesh marked the thirty-third reserve, expanding the total protected network to cover over eighty thousand square kilometers of designated wild elephant habitats nationwide.

28. (B) Singhbhum Elephant Reserve
Singhbhum Elephant Reserve, located in Jharkhand, holds the historical significance of being the very first Elephant Reserve notified in India in September 2001. Established under Project Elephant, this administrative reserve encompasses rich moist deciduous forests and secures critical habitat corridors used by wild Asian elephant herds across central eastern India.

29. (A) Uttar Pradesh
The Terai Elephant Reserve, covering an area of 3,049 square kilometers, is located in the northern state of Uttar Pradesh. Notified in 2022, it encompasses protected forest zones including Dudhwa National Park and Pilibhit

Tiger Reserve, offering holistic landscape-level protection to wild Asian elephants, tigers, and swamp deer in the region.

30. (C) Karnataka
According to the national synchronous elephant census conducted in 2017, Karnataka recorded the largest population of wild Asian elephants among all Indian states, with an estimated six thousand individuals. The state's vast interconnected protected areas in the Western Ghats and Nilgiri Biosphere Reserve provide critical habitat and corridors sustaining these elephant populations.

31. (A) II, III, I
Based on the 2017 Elephant Census, Karnataka recorded the highest population with over six thousand elephants, followed by Assam with over five thousand, and Kerala ranking third with over three thousand individuals. Arranging these states in descending order of wild elephant abundance correctly yields Karnataka first, Assam second, and Kerala third in population size.

32. (C) By respective State Governments following Central approval
Elephant Reserves in India are officially notified and declared by respective State Governments after receiving technical concurrence and formal approval from the central Ministry of Environment, Forest and Climate Change. Under the administrative framework of Project Elephant, states manage these reserves to protect habitats, secure corridors, and mitigate human-elephant conflicts locally.

33. (B) Wildlife (Protection) Act, 1972
The National Tiger Conservation Authority was formally constituted as a statutory body under the Ministry of Environment, Forest and Climate Change through the Wildlife Protection Amendment Act of 2006. This amendment inserted Chapter IVB into the Wildlife Protection Act of 1972, providing statutory authority to oversee tiger reserve management and tiger conservation plans nationwide.

34. (D) Minister for Environment, Forest and Climate Change
Under the statutory framework of the Wildlife Protection Act of 1972, the Union Minister for Environment, Forest and Climate Change serves as the ex-officio Chairperson of the National Tiger Conservation Authority. The Minister for State in the ministry serves as Vice-Chairperson, ensuring top-level executive leadership and political oversight for wild tiger conservation.

35. (A) It is a statutory body
The National Tiger Conservation Authority holds full legal status as a statutory body created under powers conferred by Chapter IVB of the Wildlife Protection Act, 1972. Formally established in 2006, NTCA derives its authority, regulatory functions, and operational mandate directly from parliamentary legislation rather than executive decrees or non-governmental organizational frameworks.

36. (C) 3 members (2 from Lok Sabha and 1 from Rajya Sabha)
Under Section 38L of the Wildlife Protection Act of 1972, the constitution of the National Tiger Conservation Authority explicitly includes three Members of Parliament. Two members are nominated from the Lok Sabha by the Speaker, while one member is nominated from the Rajya Sabha by the Chairman, ensuring parliamentary representation and democratic oversight.

37. (A) Approving Tiger Conservation Plans prepared by State Governments
A fundamental statutory function of the National Tiger Conservation Authority is evaluating and formally approving Tiger Conservation Plans submitted by state governments. NTCA sets management standards, evaluates ecological connectivity, enforces anti-poaching protocols, and ensures that state field directors adhere strictly to legal conservation guidelines across all designated tiger reserves in India.

38. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
The National Tiger Conservation Authority possesses statutory power under Chapter IVB of the Wildlife Protection Act, 1972 to issue binding directives to state governments regarding tiger protection. Because NTCA is a legally empowered statutory body tasked with enforcing standard conservation protocols, its legal mandate directly supports and explains its authority to direct states.

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39. (C) Every 4 years
The All-India Tiger Estimation is conducted nationwide once every four years by the National Tiger Conservation Authority in scientific partnership with the Wildlife Institute of India and state forest departments. This quadrennial monitoring exercise utilizes standardized ground surveys, camera traps, and spatial modeling to track tiger demographics and forest habitat trends over time.

40. (C) M-STrIPES
M-STrIPES, which stands for Monitoring System for Tigers - Intensive Protection and Ecological Status, is a specialized software application developed by the National Tiger Conservation Authority. It uses GPS mobile tracking and spatial analysis tools to record frontline forest staff patrols, monitor wildlife sightings, track illegal human activities, and assess habitat conditions.

41. (D) Ground surveys by forest staff for carnivore signs and prey data
In the standardized multi-phase methodology of the All-India Tiger Estimation, Phase I primarily entails extensive ground surveys conducted by frontline forest department staff. Patrol team personnel walk designated beat transects to systematically record evidence of carnivore presence, such as pugmarks and scats, alongside monitoring ungulate prey density and habitat disturbance indicators.

42. (A) Spatially Explicit Capture-Recapture (SECR) framework
The Spatially Explicit Capture-Recapture framework is the advanced statistical methodology universally adopted for estimating tiger population density and abundance from camera trap data in India. SECR models individual animal home ranges, spatial trap layouts, and detection probabilities, providing scientifically robust population estimates while accounting for individuals not photographed during sampling periods.

43. (B) Pugmark identification is highly subjective and prone to overestimation.
The traditional pugmark tracking method was largely replaced by camera trapping because manual tracing of paw prints was highly subjective and frequently led to gross overestimation of tiger numbers. Different soil substrates altered imprint dimensions, and field staff often misidentified individual tracks, whereas camera trap photography provides objective, verifiable visual identification.

44. (A) Wildlife Institute of India (WII)
The Wildlife Institute of India, based in Dehradun, serves as the primary scientific and technical partner of the National Tiger Conservation Authority. WII designs sampling methodologies, trains field personnel, processes camera trap data, conducts genetic analysis, and executes spatial ecological modeling for the quadrennial All-India Tiger Estimation monitoring reports.

45. (A) I and II only
Elephant corridors are crucial ecological tracts connecting fragmented forest habitats, facilitating seasonal migrations and maintaining genetic exchange between populations. However, linear infrastructure such as railways, roads, and canals severely impacts these movement zones, making the third statement false while verifying the accuracy of the first two descriptive ecological principles.

46. (D) Wildlife Trust of India (WTI)
The comprehensive publication titled "Right of Passage: Elephant Corridors of India" was authored and published by the Wildlife Trust of India in collaboration with the Ministry of Environment, Forest and Climate Change. This detailed conservation document identifies, maps, and prioritizes critical linear movement paths used by Asian elephants across various range states.

47. (C) Approximately 150
According to comprehensive official reports published by the central government and the Wildlife Trust of India, approximately 150 active elephant corridors have been identified across four major regional elephant ranges. Mapping these functional pathways is vital for securing habitat connectivity and mitigating human-elephant conflicts caused by landscape fragmentation nationwide.

48. (B) Expansion of linear infrastructure like highways, railways, and canals
The rapid expansion of linear infrastructure, including highways, railway tracks, irrigation canals, and power transmission lines, poses the

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most severe anthropogenic threat to elephant corridors. These artificial barriers physically dissect contiguous forest landscapes, increase accidental train strikes, disrupt ancestral seasonal migration routes, and isolate wild elephant populations into smaller fragments.

49. (D) Eco-Sensitive Zones (ESZ)
To protect critical elephant corridors and protected forest boundaries from developmental pressures, state governments declare surrounding areas as Eco-Sensitive Zones under the Environment Protection Act. ESZs act as transitional regulatory buffers that prohibit polluting industries, restrict commercial development, and regulate land-use changes to minimize ecological disturbance along animal movement pathways.

50. (A) The severe fragmentation and degradation of natural elephant habitats
The main ecological driver behind escalating human-elephant conflict across India is extensive habitat fragmentation and forest loss. As historical migratory paths are disrupted by agriculture, urban expansion, and linear infrastructure, elephant herds are forced to traverse human-dominated agricultural landscapes in search of adequate food, water, and shelter, increasing conflict encounters.

51. (C) Hanging solar-powered fences and chili-rope fences
Non-lethal physical mitigation strategies such as solar-powered electric fences, chili-rope barriers, and beehive fences effectively deter wild elephants from entering agricultural fields without harming them. These innovative barriers leverage the animal's natural olfactory sensitivity and behavioral avoidance mechanisms, offering sustainable crop protection while maintaining safety for farming communities and wildlife.

52. (A) P-2, Q-1, R-3, S-4
Project RE-HAB utilizes bee boxes as natural biological deterrents, Early Warning Systems send direct SMS alerts to local villagers, Physical Barriers include deep elephant-proof trenches around farms, and Acoustic Deterrents deploy sirens or loud audio devices to deter herds. Matching these conflict mitigation strategies correctly pairs each project with its core functional component.

53. (D) Through structured ex-gratia compensation following official damage verification
State forest departments provide financial relief to farmers for agricultural losses caused by wild elephants through structured ex-gratia compensation schemes. Following formal reporting, field inspection, and official damage verification by forest staff, standardized monetary compensation is disbursed to affected landowners to relieve financial strain and reduce retaliatory sentiment against wildlife.

54. (B) Alert locomotive drivers of elephant presence to prevent train hits
Automated infrared sensors and optic fiber detection systems installed along vulnerable railway tracks serve to detect wild elephants approaching railway lines. Upon detecting animal movement near the tracks, these systems instantly transmit real-time warnings to locomotive drivers and station masters, allowing trains to reduce speed and prevent fatal collisions with elephants.

55. (C) Sub-adult tigers dispersing in search of new territories and adequate prey
A primary driver for tigers entering human-dominated landscapes is the natural dispersal process of sub-adult tigers. As young tigers reach maturity, dominant resident adults push them out of established core reserve territories, forcing them to move through peripheral buffer zones, agricultural fields, and human settlements in search of vacant territories and prey.

56. (D) It must be verified and monitored to push it back or tranquilize it safely
The Standard Operating Procedures issued by the National Tiger Conservation Authority mandate that when a tiger strays into human settlements, forest authorities must first verify its presence, control crowds, and attempt pushing it back into contiguous forests. If trapping or driving back fails, trained veterinarians safely tranquilize and capture the animal.

57. (A) I, II, and III only
Only the Chief Wildlife Warden possesses statutory power to declare a tiger a man-eater, based strictly on confirmed, deliberate human stalking behavior rather than accidental encounters. Declared animals should be captured or relocated if possible. Gram Panchayats lack legal authority to make such declarations,

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making statement four false while confirming statements one, two, and three.

58. (B) Accidental encounters happen when a human unexpectedly stumbles upon a tiger protecting its kill or cubs.
In wildlife management, an accidental encounter occurs when a human unexpectedly surprises a wild tiger in dense cover, triggering a defensive reaction, particularly when the tiger is guarding cubs or feeding. Conversely, a habitual man-eater actively tracks, stalks, and hunts humans deliberately as regular prey without provocation across settled landscapes.

59. (B) To manage crowd control, relay information, and assist forest staff in conflicts
Primary Response Teams consist of trained local villagers organized near reserve boundaries to assist during human-wildlife encounters. Their primary role involves managing curious crowds, preventing retaliatory violence, monitoring animal movements, and immediately relaying accurate field information to forest department personnel to facilitate safe and effective conflict resolution operations.

60. (A) Core Zone
Under Section 38V of the Wildlife Protection Act, 1972, the term Critical Tiger Habitat corresponds legally to the designated Core Zone of a Tiger Reserve. These areas are identified based on scientific data to be kept inviolate for tiger conservation, requiring complete freedom from human settlements, commercial activity, and biotic disturbances.

61. (C) It must be kept inviolate and free from human settlements and biotic interference
The Core Zone or Critical Tiger Habitat of a Tiger Reserve must be maintained as an inviolate sanctuary free from human habitations, forestry operations, commercial extraction, and livestock grazing. This mandatory requirement ensures undisturbed ecological conditions essential for tiger breeding, cub rearing, and sustaining healthy wild prey populations without anthropogenic stress.

62. (D) To promote coexistence between wildlife and local human activities and secure livelihoods
The primary management objective of the Buffer Zone in a Tiger Reserve is promoting harmonious coexistence between wildlife and resident human populations. Surrounding the inviolate core, buffer areas absorb external ecological impacts, provide habitat extension for dispersing animals, and support local community livelihoods through eco-development initiatives and sustainable resource management.

63. (B) Core Area → Buffer Area → Transition Area
The correct spatial hierarchy of a Tiger Reserve landscape starts with the most strictly protected central Core Area, followed outward by the peripheral Buffer Area, and extends into the surrounding Transition Area. This zonal structure ensures progressive buffer protection, moving from completely inviolate wildlife habitat to multi-use human-dominated landscapes.

64. (B) Expert Committee constituted for the purpose and the NTCA
State Governments formally notify the Core or Critical Tiger Habitat of a Tiger Reserve based on scientific recommendations from an independent Expert Committee constituted specifically for that purpose, in consultation with the National Tiger Conservation Authority. This process ensures legal compliance, scientific rigor, and stakeholder consultation under the Wildlife Protection Act.

65. (B) 20%
According to comprehensive ecotourism guidelines issued by the National Tiger Conservation Authority, a maximum of twenty percent of the designated Core Zone area of a Tiger Reserve can be opened for regulated, low-impact tourist vehicular safaris. This cap ensures minimum disturbance to core breeding habitats while allowing public awareness and nature education.

66. (A) High-density, exploitative resort-based mass tourism
Current ecotourism guidelines formulated by the National Tiger Conservation Authority explicitly discourage high-density, commercialized mass tourism and unguided resort construction near tiger reserves. The framework mandates regulated, low-impact, community-centered ecotourism that minimizes ecological footprint, avoids habitat disturbance, and directly benefits fringe village economies over commercial exploitation.

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67. (C) Local Advisory Committee (LAC)
NTCA guidelines mandate establishing a Local Advisory Committee for every Tiger Reserve to regulate ecotourism and ensure community participation. Comprising regional administrators, forest officials, local representatives, and conservationists, the LAC oversees tourist carrying capacity, monitors resort developments, and ensures equitable sharing of tourism benefits with fringe village communities.

68. (A) It is strictly prohibited.
Under statutory policies enforced by the National Tiger Conservation Authority and provisions of the Wildlife Protection Act, constructing new permanent tourist infrastructure, such as commercial hotels, lodges, or private resorts, inside the core zone of any tiger reserve is strictly prohibited to preserve inviolate wildlife habitats without commercial encroachment.

69. (D) To benefit local buffer communities and reduce disturbance to breeding tigers
NTCA guidelines emphasize shifting primary tourist pressure from core zones to peripheral buffer zones to minimize stress on breeding wild tiger populations. Developing regulated ecotourism in buffer areas creates direct economic and employment opportunities for local fringe communities, building local stewardship for wildlife while keeping core habitats strictly inviolate.

70. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
The Wildlife Crime Control Bureau is a statutory multidisciplinary body established under the Ministry of Environment, Forest and Climate Change. It was created through a 2006 amendment inserting Section 38Y into the Wildlife Protection Act of 1972, directly empowering the agency to combat organized wildlife crime through centralized intelligence gathering.

71. (C) New Delhi
The national headquarters of the Wildlife Crime Control Bureau is located in New Delhi. Operating under the central Ministry of Environment, Forest and Climate Change, the bureau coordinates intelligence gathering, cross-border anti-poaching operations, and multi-agency enforcement activities through its regional offices situated across major transit nodes in India.

72. (C) 2007
Following statutory amendments passed in 2006 under the Wildlife Protection Act of 1972, the Wildlife Crime Control Bureau officially became operational in June 2007. The creation of this multidisciplinary body filled a vital enforcement gap by centralizing intelligence, curbing illegal wildlife networks, and assisting law enforcement agencies nationwide.

73. (A) Operation Save Kurma
Operation Save Kurma was a highly successful, specialized enforcement operation spearheaded by the Wildlife Crime Control Bureau to combat the illegal poaching, smuggling, and trade of live freshwater turtles and tortoises in India. The initiative resulted in massive seizures of live reptiles and exposed international illegal trafficking syndicates.

74. (B) Collecting and collating intelligence related to organized wildlife crime
A core function of the Wildlife Crime Control Bureau is collecting, collating, analyzing, and disseminating intelligence regarding organized wildlife poaching and illegal trafficking. WCCB coordinates multi-agency enforcement, maintains a centralized wildlife crime database, assists state police and customs officials, and conducts border inspections to intercept illegal wildlife shipments.

75. (B) Ministry of Environment, Forest and Climate Change
The Wildlife Crime Control Bureau functions under the administrative and financial control of the Ministry of Environment, Forest and Climate Change. Headed by an officer holding the rank of Additional Director General of Forests, WCCB acts as India's lead specialized enforcement agency against national and cross-border illegal wildlife trade.

76. (A) Demand for tiger parts in Traditional Chinese Medicine (TCM)
The persistent illegal poaching and international trafficking of wild tigers is primarily driven by high commercial demand for tiger bones, claws, and derivatives used in Traditional Chinese Medicine. Despite scientific evidence debunking their medicinal efficacy, consumer demand in

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East Asian markets fuels organized criminal syndicates targeting wild tiger populations.

77. (C) Skin, bones, and claws
In the global black market, tiger skins, bones, claws, teeth, and whiskers represent the most heavily trafficked body parts. Skins are sought after as luxury decorative items or status symbols, while bones and claws are processed into traditional medicinal tonics or carved ornaments, commanding exorbitant prices across transnational illegal wildlife syndicates.

78. (A) I and II only
The Special Tiger Protection Force is a dedicated armed force raised to protect vulnerable tiger reserves, receiving one hundred percent central assistance for establishment and operational equipment under Project Tiger. STPF personnel actively patrol both core and buffer zones, making statement three false while validating the first two statements.

79. (C) Porous land borders along the Himalayas into Nepal, Tibet, and China
Historically, the porous Himalayan land borders crossing through Nepal, Bhutan, and Tibet represent the most notorious transboundary routes for smuggling poached tiger derivatives out of India into China. Remote mountain tracks, rugged terrain, and limited border posts make these northern overland corridors heavily exploited by transnational wildlife trafficking networks.

80. (B) Project Tiger
Financial and technical assistance for raising, equipping, and deploying the Special Tiger Protection Force across designated tiger reserves is routed through the Centrally Sponsored Scheme of Project Tiger. Administered by NTCA, this central support assists states in maintaining specialized armed units to secure core tiger populations against poaching.

81. (D) TRAFFIC
TRAFFIC, the Wildlife Trade Monitoring Network, is a leading international non-governmental organization operating as a joint programme of WWF and IUCN. Specializing in monitoring illegal global wildlife trade, TRAFFIC works closely with governments, CITES, and law enforcement agencies to investigate, analyze, and curb illicit trafficking in tigers and endangered fauna.

82. (A) African Savanna Elephant
The African Savanna Elephant has historically suffered the highest absolute volume of illegal poaching for ivory globally. Driven by international commercial demand for carved ivory items, tens of thousands of African savanna elephants were slaughtered over recent decades, causing catastrophic population declines and triggering international bans on commercial ivory commerce.

83. (B) 1989
In 1989, the Convention on International Trade in Endangered Species of Wild Fauna and Flora enacted a landmark international ban on commercial ivory trade by placing African elephants on Appendix I. This decisive action aimed to stop rampant poaching crises across African range states by shutting down legal global markets.

84. (A) Poached ivory that finances armed conflicts and insurgencies
The term “blood ivory” refers to poached elephant tusks illegally harvested and traded to finance armed rebel groups, insurgencies, and organized criminal cartels, primarily across Central and East Africa. Similar to blood diamonds, blood ivory links illegal wildlife trafficking directly with violence, militia funding, and severe civil instability in trade regions.

85. (D) Elephant Trade Information System
ETIS stands for Elephant Trade Information System, an international comprehensive database managed by TRAFFIC on behalf of CITES parties. ETIS tracks and analyzes worldwide law enforcement seizure records involving illegal ivory and other elephant product confiscations, helping monitor global trade dynamics, illegal supply chains, and enforcement trends across countries.

86. (B) P-2, Q-1, R-4, S-3
MIKE monitors site-level illegal elephant killings, ETIS tracks global ivory seizure data, M-STrIPES conducts ecological and patrol tracking in tiger reserves, and RhoDIS maintains DNA indexing for rhinoceros protection. Correctly pairing these monitoring tools aligns each conservation

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database with its precise technical function and target wildlife species application.

87. (C) Wildlife (Protection) Act, 1972
In India, domestic commercial trade, possession, carving, and sale of ivory derived from wild or captive Indian elephants is strictly banned under the Wildlife Protection Act of 1972. The 1991 legislative amendment comprehensively prohibited all internal ivory commerce, ensuring maximum statutory protection for Asian elephants against poaching incentives.

88. (D) Convention on International Trade in Endangered Species of Wild Fauna and Flora
CITES stands for the Convention on International Trade in Endangered Species of Wild Fauna and Flora. Drafted in 1973 under the auspices of IUCN, this international agreement ensures that cross-border trade in specimens of wild animals and plants does not threaten their survival, regulating over 38,000 species globally.

89. (A) Appendix I
Species threatened with extinction that are or may be affected by trade are listed under Appendix I of CITES. International commercial trade in specimens, parts, or derivatives of Appendix I species is strictly prohibited, permitting non-commercial cross-border transfers only under exceptional circumstances with strict export and import permit documentation.

90. (B) 1976
India signed the CITES convention in 1974 and formally ratified it in July 1976, officially becoming a State Party bound by its international provisions. India implements CITES controls through its domestic legal frameworks, primarily using the Wildlife Protection Act and Foreign Trade Policy to regulate cross-border movement of listed species.

91. (A) Appendix I
Both the Bengal Tiger and the Asian Elephant are listed in Appendix I of CITES. This classification accords them the highest level of international trade protection, strictly banning all international commercial trade in live specimens, body parts, skins, or ivory derivatives to safeguard wild populations from global trafficking exploitation.

92. (A) I, II, and III only
The Director of Wildlife Preservation acts as CITES Management Authority, WII serves as a Scientific Authority, and CITES is enforced via the Customs and Wildlife Protection Acts. CITES does not permit domestic hunting of Appendix I species, making statement four false while validating statements one, two, and three correctly.

93. (C) The Conference of the Parties (CoP)
The Conference of the Parties serves as the primary decision-making body of CITES. Comprising representative delegations from all member states, the CoP meets every two to three years to review trade implementation, amend species listings across Appendices I, II, and III, adopt enforcement resolutions, and guide global conservation policy direction.

94. (A) Schedule I
Prior to the passage of the Wildlife Protection Amendment Act of 2022, both the Bengal Tiger and the Asian Elephant received maximum legal protection under Schedule I of the Wildlife Protection Act, 1972. Offences committed against Schedule I species carried the highest statutory penalties, mandatory imprisonment, and stringent bail conditions.

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95. (A) Schedule I
Following the rationalization of schedules under the Wildlife Protection Amendment Act 2022, species listed under absolute statutory protection remain categorized under Schedule I. Both Bengal Tigers and Asian Elephants continue to enjoy highest priority legal protection under Schedule I, making hunting, capturing, or trading them subject to severe criminal penalties.

96. (B) 3 years
Under Section 51 of the Wildlife Protection Act, 1972, a first-time conviction for hunting or committing an offense within a designated Tiger Reserve involving a Schedule I animal carries a mandatory minimum imprisonment term of three years, which may extend up to seven years, alongside heavy statutory monetary fines.

97. (D) As wildlife property requiring an ownership declaration and valid certificate
Under Chapter V-A of the Wildlife Protection Act, 1972, captive elephants are legally classified as government-regulated wildlife property. Owners

must declare possession and secure a formal Ownership Certificate from the Chief Wildlife Warden, adhering strictly to official welfare guidelines without permitting commercial sale, transfer, or unauthorized private acquisitions.

98. (A) II, III, I
Under the rationalized schedules of the amended Wildlife Protection Act 2022, Schedule I accords highest protection to endangered species, Schedule II provides legal protection to other wildlife species, and Schedule IV governs CITES-listed international trade species. Arranging these from highest protection status to international trade regulations yields Schedule I, then II, then IV.

99. (C) A carved ivory figurine made from an Asian elephant's tusk
Under Section 2 of the Wildlife Protection Act, 1972, an animal article includes any item or artifact crafted from wild species listed in Schedule I or II. A carved ivory figurine crafted from an Asian elephant's tusk legally qualifies as an animal article, making its possession or commercial sale strictly illegal.

100. (C) Endangered
The Bengal Tiger is classified as Endangered on the IUCN Red List of Threatened Species. This international conservation rating reflects significant global population reduction, severe habitat fragmentation, poaching pressure, and range contraction, highlighting the critical need for continued landscape-level protection, anti-poaching enforcement, and corridor restoration across tiger range countries.

101. (B) Endangered
The Asian Elephant is categorized as Endangered on the global IUCN Red List of Threatened Species. The species has suffered significant population decline exceeding fifty percent over three generations, driven by widespread habitat loss, linear infrastructure fragmentation, human-elephant conflicts, and historical illegal poaching for tusks across its Asian range countries.

102. (C) Endangered
In 2021, the IUCN officially re-assessed African elephants into two distinct species. While the African Forest Elephant was listed as Critically Endangered due to sharp population drops, the African Savanna Elephant was categorized as Endangered, recognizing substantial declines across its continental distribution driven by ivory poaching and land-use change.

103. (C) Severe reduction in population size and geographic range
The primary quantitative criteria used by the IUCN Red List to categorize a species as Endangered include severe population size reduction, marked geographical range fragmentation, and restricted total breeding numbers. Apex ecological positioning or tourist appeal are non-quantitative attributes, making population decline rates and spatial habitat contraction the primary scientific metrics evaluated.

104. (D) International Union for Conservation of Nature (IUCN)
The International Union for Conservation of Nature is the premier global body responsible for compiling, updating, and publishing the Red List of Threatened Species. Founded in 1948, IUCN evaluates wild species extinction risks using standardized scientific criteria, serving as the international authority on global biodiversity status and species conservation priorities.

105. (D) Assertion (A) is false but Reason (R) is true.
An Endangered listing on the IUCN Red List does not automatically place a species in CITES Appendix I, as IUCN assesses biological risk while CITES regulates trade through intergovernmental treaty decisions. Because CITES listings require formal voting by member states at Conference of Parties meetings, Assertion A is false while Reason R is true.

106. (B) Panna Tiger Reserve
Panna Tiger Reserve in Madhya Pradesh executed one of the world's most successful tiger reintroduction programmes after losing its entire wild tiger population to poaching by 2009. Through translocating founder tigers from Kanha and Bandipur, meticulous monitoring, and community support, Panna successfully rebuilt a thriving, self-sustaining wild tiger population within a decade.

107. (B) Releasing the tiger into an acclimatization enclosure before full release
During tiger translocation, a soft release protocol involves housing the translocated individual within a spacious, naturalistic acclimatization

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enclosure or boma before releasing it into the wild. This temporary containment allows veterinarians and ecologists to monitor the animal's health, feeding, and stress levels while allowing it to adapt to local environmental conditions.

108. (A) Sariska Tiger Reserve
Sariska Tiger Reserve in Rajasthan was the first tiger reserve in India to pioneer tiger reintroduction via air-lifting individuals in 2008. Following local tiger extinction caused by poaching, wild tigers were airlifted by Indian Air Force helicopters from Ranthambore National Park to Sariska to re-establish a viable breeding population in the landscape.

109. (C) Ensuring genetic compatibility and similar landscape adaptability
Before translocating wild tigers between habitats, conservation geneticists evaluate genetic compatibility and ecological similarity between source and recipient populations. Selecting individuals with shared evolutionary lineages and similar habitat adaptations prevents outbreeding depression, minimizes stress, and optimizes survival, social integration, and breeding success in the target destination ecosystem.

110. (D) National Tiger Conservation Authority (NTCA)
The National Tiger Conservation Authority formulates and issues comprehensive Standard Operating Procedures governing tiger translocations, stray management, reintroduction, and rehabilitation in India. NTCA guidelines mandate strict protocols for capture, health screening, radio-collaring, soft release, and post-release monitoring to ensure animal welfare and human safety across state forest departments.

111. (C) Rs. 15 Lakh
To create inviolate wildlife habitats in core tiger reserve areas, the central government offers a voluntary relocation package to resident forest families. Under updated NTCA financial norms, the financial incentive package provides fifteen lakh rupees per eligible family, enabling voluntary resettlement outside protected reserve boundaries to minimize human-wildlife conflict.

112. (A) I and II only
Indian Rhino Vision 2020 aimed to establish a wild population of 3,000 rhinos across Assam by translocating individuals from Kaziranga and Pabitora to protected areas like Manas National Park. The project successfully re-established rhino populations in Manas, making statement three false while validating the accuracy of statements one and two.

113. (B) Vulnerable
The Greater One-horned Rhinoceros found in India and Nepal is classified as Vulnerable on the IUCN Red List of Threatened Species. Successful anti-poaching measures, habitat protection, and translocation initiatives in reserves like Kaziranga helped downlist the species from Endangered to Vulnerable, reflecting positive recovery of wild rhino populations over recent decades.

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114. (A) Project Snow Leopard
Project Snow Leopard was launched by the Ministry of Environment and Forests in 2009 to safeguard the apex predator of high-altitude Himalayan ecosystems. Operating across Jammu and Kashmir, Ladakh, Himachal Pradesh, Uttarakhand, Sikkim, and Arunachal Pradesh, the project emphasizes landscape-level conservation, community co-management, and habitat protection for snow leopards.

115. (C) Gujarat
The Asiatic Lion Conservation Project focuses exclusively on protecting the last remaining wild population of Asiatic lions, found in the Gir landscape of Gujarat. Supported by central and state government funding, the initiative enhances disease surveillance, habitat management, frontline anti-poaching patrols, and human-lion conflict mitigation across the Saurashtra peninsula.

116. (A) Kaziranga National Park
Kaziranga National Park in Assam holds the distinction of harbouring the world's largest population of the Greater One-horned Rhinoceros, supporting over two-thirds of its global wild population. Designated as a UNESCO World Heritage Site, Kaziranga's fertile alluvial floodplains provide ideal riverine grassland and wetland habitat sustaining these megaherbivores.

117. (D) To build a DNA database tracing poached horns to individual rhinos
The Rhino DNA Index System (RhoDIS) was implemented in India to establish a comprehensive genetic database of individual rhinoceroses. By cataloging DNA profiles from dung, blood, and tissue samples, RhoDIS enables forensic identification, allowing confiscated illegal rhino horns to be linked to specific poaching incidents and providing crucial evidence for prosecution.

118. (B) Very High Frequency
In wildlife telemetry and telemetry monitoring, the abbreviation VHF stands for Very High Frequency. VHF radio collars emit distinct pulsed radio signals that field researchers track using handheld directional yagi antennas and receivers, allowing forest staff to pinpoint the fine-scale location, territorial movement, and survival status of collared wild animals.

119. (A) P-3, Q-4, R-2, S-1
VHF collars emit ground-based radio beeps, GPS collars log exact coordinates on board, Argos satellite collars transmit coordinates globally without cellular dependency, and GSM collars transmit spatial data via mobile phone networks. Matching these tracking technologies correctly connects each telemetry hardware platform with its distinct functional transmission mechanism and operational feature.

120. (B) 3 to 5%
According to global ethical and scientific standards for wildlife telemetry, the total mass of a radio collar should not exceed three to five percent of the animal's body weight. Staying within this weight limit ensures the collar does not impede natural locomotion, hunting behavior, feeding, or physical well-being of animals.

121. (A) To safely detach the collar via remote command or timer, preventing lifelong burden
Modern wildlife GPS collars are integrated with an automated "drop-off" mechanism programmed to trigger via timer or remote radio signal. This safety mechanism releases the collar from the animal's neck once telemetry monitoring objectives are complete or battery power depletes, preventing the animal from wearing hardware permanently without requiring recapture.

122. (B) By using geofencing to send automated SMS alerts when elephants approach human habitations
Satellite tracking aids conflict mitigation by enabling virtual geofencing around problem elephant herds. When a radio-collared elephant crosses a designated geographical boundary near villages or farmland, the tracking system automatically sends real-time SMS alerts to forest officials and village response teams, enabling rapid deployment to herd animals away safely.

123. (B) Xylazine and Ketamine
In Indian wildlife veterinary medicine, a combination of Xylazine and Ketamine is commonly administered to safely immobilize large wild carnivores like tigers. Administered via remote darting equipment, this anesthetic formulation provides rapid sedation, muscle relaxation, and analgesia, allowing veterinarians to safely conduct radio-collaring, health checks, or translocation procedures.

124. (A) Unique stripe patterns on their flanks
Camera trap estimation relies on the unique stripe patterns present on the flanks and body of Bengal tigers to identify individuals. Similar to human fingerprints, no two tigers possess identical stripe configurations. High-resolution photographic evidence enables researchers to distinguish individual animals, compile photographic capture histories, and calculate precise population density.

125. (C) To photograph both flanks of the tiger simultaneously for accurate identification
Camera traps are deployed in paired sets facing opposite sides of trails to photograph both the left and right flanks of a passing animal simultaneously. Because a tiger's stripe pattern is asymmetrical and unique on each side, capturing double-sided photographs ensures complete individual profile matching, preventing misidentification or double counting.

126. (D) Passive Infrared (PIR) sensors detecting heat and motion
Modern camera traps utilized in wildlife monitoring rely on Passive Infrared sensors to trigger the camera shutter. PIR sensors detect changes in ambient surface temperature and motion when a warm-bodied animal moves across the sensor's field of view, instantly activating the

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digital camera to record images without relying on physical contact.

127. (C) Capture-Mark-Recapture (CMR)
The Capture-Mark-Recapture framework forms the core mathematical foundation for estimating wild tiger populations from camera trap survey data. Individual tigers are visually "marked" by their unique stripe patterns upon first photographic capture, and subsequent detections act as "recaptures," allowing statistical algorithms to model detection probabilities and calculate overall population size.

128. (B) I, II, and IV only
Camera traps provide verifiable photographic evidence, eliminate subjective human error in tracking, and effectively survey cryptic nocturnal species. However, infrared sensors cannot automatically detect gender without clear anatomical photos, making statement three false while validating statements one, two, and four as clear operational advantages over traditional pugmark tracking.

129. (D) CaTRAT (Camera Trap Data Repository and Analysis Tool)
CaTRAT, standing for Camera Trap Data Repository and Analysis Tool, is the software application developed to manage and process massive image datasets collected during national tiger estimations. Utilizing automated artificial intelligence image-recognition algorithms, CaTRAT filters non-wildlife images, categorizes animal species, and organizes individual tiger photographs for pattern matching.

130. (B) 10 years
Under statutory provisions enforced by the National Tiger Conservation Authority, a Tiger Conservation Plan operates for a standardized duration of ten years. The Field Director prepares this ten-year technical document to guide habitat management, anti-poaching strategies, eco-development, and financial requirements, requiring comprehensive review and renewal upon expiration.

131. (C) Section 38V
The statutory mandate requiring state governments to prepare and implement a comprehensive Tiger Conservation Plan for each tiger reserve is laid down under Section 38V of the Wildlife Protection Act, 1972. This legal provision outlines required components, including core habitat protection, buffer management, and corridor conservation frameworks.

132. (A) Adjoining areas and wildlife corridors connecting the reserve
A comprehensive Tiger Conservation Plan comprises three main structural parts: core area management, buffer area management, and adjoining habitat management. The third component focuses specifically on securing surrounding lands and wildlife corridors connecting the reserve to adjacent protected areas, ensuring landscape connectivity and gene flow across tiger ranges.

133. (A) Drafting by Field Director → Approval by State CWLW → Final Approval by NTCA
The preparation of a Tiger Conservation Plan begins with initial drafting by the Reserve's Field Director. The draft is then reviewed and endorsed by the Chief Wildlife Warden of the state, before being formally submitted to the National Tiger Conservation Authority for final evaluation and statutory approval under the Wildlife Protection Act.

134. (B) Chief Wildlife Warden (CWLW)
In state forest department administration, the Chief Wildlife Warden holds ultimate statutory responsibility as the nodal officer for wildlife conservation and protected area management. The CWLW approves management plans, enforces the Wildlife Protection Act, endorses Tiger Conservation Plans, and exercises statutory authority over wild species management statewide.

135. (C) The Tiger Conservation Plan (TCP)
In territorial forest divisions overlapping with tiger reserve buffer areas, standard forest Working Plans must align directly with the statutory Tiger Conservation Plan. Integrating forestry practices with the TCP ensures timber extraction, grazing regulations, and habitat management across territorial divisions do not compromise wildlife corridor connectivity or tiger conservation objectives.

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136. (D) To act as a 'shock absorber' by regulating development activities in the vicinity
The primary ecological objective of declaring an Eco-Sensitive Zone around protected areas like Tiger Reserves is creating a transitional

"shock absorber." ESZs regulate commercial development, prohibit polluting industries, and manage land-use change around reserve boundaries, thereby minimizing anthropogenic pressures and habitat disturbance on wildlife populations living within.

137. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Commercial mining is strictly prohibited in wildlife corridors and Eco-Sensitive Zones surrounding Tiger Reserves because mining causes severe, irreversible habitat destruction. Heavy machinery, landscape excavation, and road construction dissect natural habitats and block migration paths, making the ecological impacts stated in Reason R the exact rationale explaining Assertion A.

138. (B) Animal underpasses and overpasses with acoustic barriers
Along National Highway 44 passing through the critical Pench Tiger Reserve corridor, specialized eco-friendly infrastructure was constructed to protect wildlife. Dedicated animal underpasses and overpasses fitted with sound barriers permit unhindered movement of tigers, leopards, and ungulates beneath the highway, establishing a world-class model for mitigating linear infrastructure impacts.

139. (B) Eco-friendly agriculture, agro-forestry, and sustainable forest produce extraction
In buffer zone management, eco-friendly land uses such as organic farming, agro-forestry, non-timber forest produce harvesting, and sustainable eco-tourism are actively promoted. These sustainable practices preserve natural vegetation cover, support local rural livelihoods, reduce human-wildlife conflict incentives, and maintain land compatibility with surrounding protected wildlife habitats.

140. (A) Community Reserve
Under the Wildlife Protection Act, 1972, a Community Reserve is a legal designation enabling private landholders or local communities to voluntarily conserve wildlife habitat on their land. Declaring a Community Reserve offers statutory protection to critical wildlife corridors without transferring land ownership away from local owners to the state government.

141. (C) Landscape-level Conservation Strategy
The strategic evolution from managing isolated protected areas to managing interconnected networks of reserves, corridors, and buffer zones is known as Landscape-level Conservation. This holistic scientific framework preserves ecological processes, supports wide-ranging megafauna movements, maintains genetic diversity, and builds climate resilience across broad regional ecosystems rather than isolated pockets.

142. (C) 3,682
According to updated camera-trap estimates from the 5th cycle of the All-India Tiger Estimation released in 2023, India's wild tiger population for 2022 was estimated at an average of 3,682 individuals. This population figure reflects steady annual growth, highlighting successful landscape conservation efforts across major tiger landscapes nationwide.

143. (C) Madhya Pradesh
Madhya Pradesh recorded the highest number of wild tigers in India during the 2022 All-India Tiger Estimation census, retaining its status as the "Tiger State." Hosting 785 tigers, the state showed significant population growth compared to previous cycles, supported by extensive protected reserve networks like Bandhavgarh, Kanha, and Pench.

144. (A) I and II only
In Uttar Pradesh, the estimated tiger population exceeded 200 individuals in the 2022 census, with Dudhwa Tiger Reserve holding the state's largest tiger share. The population recorded growth rather than a decline, making statement three false while validating statements one and two regarding the state's expanding wild tiger numbers.

145. (C) 75%
As of 2023, India is home to approximately 75 percent of the world's global wild tiger population. This dominance highlights the success of Project Tiger, statutory protection under NTCA, and effective reserve management, making India the paramount stronghold for Bengal tiger conservation globally across thirteen tiger range countries.

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146. (A) Central Indian Highlands and Eastern Ghats landscape
The Central Indian Highlands and Eastern Ghats landscape complex holds the largest absolute tiger population in India, supporting over 1,100 tigers according to the 2022 census. Spanning multiple states including Madhya Pradesh, Maharashtra, Chhattisgarh, and Odisha, this extensive landscape encompasses vast contiguous deciduous forests vital for tiger survival.

147. (C) Jim Corbett Tiger Reserve
Jim Corbett Tiger Reserve in Uttarakhand supports the highest tiger density and absolute tiger population among all individual reserves in India, hosting over 260 tigers within its boundaries. Its fertile Ramganga river valley, high ungulate prey density, and vast contiguous sal forests create an ideal habitat sustaining this dense wild population.

148. (B) July 29
International Tiger Day is celebrated globally every year on July 29 to promote wild tiger conservation and raise public awareness. Established to highlight threats like habitat loss and poaching, the day provides a global platform for governments, organizations, and citizens to renew commitments towards protecting wild tiger habitats.

149. (D) St. Petersburg Tiger Summit
International Tiger Day was established in 2010 during the landmark St. Petersburg Tiger Summit held in Russia. At this historic meeting, thirteen tiger-range countries pledged to double the global population of wild tigers by 2022 under the TX2 initiative, establishing July 29 as an annual global awareness day.

150. (A) P-2, Q-3, R-4, S-1
World Environment Day occurs on June 5, International Tiger Day on July 29, World Elephant Day on August 12, and World Wildlife Day on March 3. Correctly matching these environmental awareness observances pairs each designated observance day with its internationally established annual calendar date.

151. (C) To double the global population of wild tigers by the year 2022
The explicit goal of the global TX2 campaign, initiated by WWF and thirteen tiger-range countries at the 2010 St. Petersburg Summit, was doubling the worldwide wild tiger population by the year 2022. The commitment drove major conservation investments, habitat protection, anti-poaching enforcement, and corridor restoration across Asian landscapes.

152. (D) Global Tiger Forum (GTF)
The Global Tiger Forum is an intergovernmental international organization headquartered in New Delhi, exclusively dedicated to wild tiger conservation worldwide. Comprising tiger-range countries and international conservation partners, GTF coordinates capacity building, policy formulation, field technical assistance, and international cooperation to safeguard wild tigers and their habitats globally.

153. (A) Conservation Assured | Tiger Standards
CA|TS stands for Conservation Assured | Tiger Standards, an international accreditation framework designed to evaluate effective management of tiger conservation areas. CA|TS sets standard benchmarks for reserve management, law enforcement, habitat protection, and community engagement, verifying whether participating protected areas meet rigorous criteria required to support wild tigers.

154. (B) Dudhwa and Pilibhit
The Terai Elephant Reserve in Uttar Pradesh integrates rich forest landscapes and wildlife corridors primarily surrounding Dudhwa Tiger Reserve and Pilibhit Tiger Reserve. Combining these protected areas under a joint management framework strengthens habitat protection, secures seasonal migration pathways, and coordinates anti-poaching efforts for Asian elephants across northern Uttar Pradesh.

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155. (B) Around 350
According to official state wildlife census records and estimates, Uttar Pradesh supports a resident and migratory wild elephant population of approximately 350 individuals. These elephants primarily inhabit the northern Terai and Bhabar forest belts, moving between protected habitats in Dudhwa, Pilibhit, Bijnor, and adjacent forest divisions along Uttarakhand.

156. (A) Infrastructure development and fragmentation along the UP-Uttarakhand border
The wild elephant population traversing the Shivalik-Bijnor landscape faces major threats

from infrastructure development and habitat fragmentation along the Uttar Pradesh-Uttarakhand border. Expanding highways, railway tracks, urban sprawl, and agricultural encroachment dissect traditional migratory corridors, leading to isolated herd fragments and increased human-elephant conflict encounters.

157. (C) They are migratory, moving seasonally between Uttarakhand and Uttar Pradesh forests Wild elephants in northern Uttar Pradesh, particularly across Bijnor and Saharanpur divisions, display migratory movement patterns. Herds move seasonally between forested tracts in Uttarakhand's Rajaji and Corbett landscapes and northern Uttar Pradesh forests, following traditional river corridors and foraging grounds in search of seasonal food, water, and shelter.

158. (D) The Terai and Bhabar tracts
Project Elephant implementation in Uttar Pradesh focuses prominently on managing human-elephant conflict across the humid Terai and Bhabar forest tracts. These low-lying northern regions feature dense forests, rivers, and agricultural fields where wild elephant movements frequently overlap with human settlements, necessitating early warning systems, trenching, and compensation mechanisms.

159. (A) I, II, and III only
The Terai Elephant Reserve is India's 33rd Elephant Reserve, spanning over 3,000 square kilometers across Dudhwa and Pilibhit tiger landscapes under concurrent management. The reserve was not funded by the World Bank, making statement four false while validating statements one, two, and three regarding its size, status, and administration.

160. (B) Mathura
India's first specialized Elephant Rescue and Care Centre was established in Mathura, Uttar Pradesh, as a collaborative initiative between the State Forest Department and Wildlife SOS. The facility provides specialized veterinary treatment, rehabilitation, lifetime care, and sanctuary for abused, injured, sick, or rescued captive and wild Asian elephants.

161. (D) Mysuru
In April 2023, India commemorated the 50th anniversary of Project Tiger during a mega international event inaugurated by the Prime Minister in Mysuru, Karnataka. The commemorative event celebrated five decades of tiger conservation achievements, released updated national tiger population figures, and launched the International Big Cats Alliance.

162. (A) Amrit Kaal Ka Tiger Vision
During the 50th-anniversary celebration of Project Tiger in Mysuru, a forward-looking vision document titled "Amrit Kaal Ka Tiger Vision" was released. The document outlines long-term conservation targets for the next twenty-five years, emphasizing landscape restoration, technology adoption, local community involvement, and securing tiger connectivity across Indian range landscapes.

163. (C) 7
The International Big Cats Alliance, launched by India in 2023, focuses on global conservation of seven major big cat species: tiger, lion, leopard, snow leopard, puma, jaguar, and cheetah. IBCA facilitates international cooperation, technical assistance, knowledge sharing, and financial mobilization among range countries to secure big cat populations worldwide.

164. (A) Kaziranga National Park
To mark thirty years of Project Elephant, the national 'Gaj Utsav 2023' festival was inaugurated by the President of India in Kaziranga National Park, Assam. The event aimed to promote elephant conservation, highlight corridor protection, address human-elephant conflict, and honor local community contributions toward protecting Asian elephants.

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165. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Maintaining genetic connectivity between fragmented tiger populations requires functional forest corridors to prevent isolation. Isolated populations in small reserves suffer from inbreeding depression, reduced genetic diversity, and heightened extinction risk, directly explaining why viable connecting corridors stated in Assertion A are essential for long-term population survival.

166. (B) Periyar Tiger Reserve
In the 5th cycle of the Management Effectiveness Evaluation of Tiger Reserves released in 2023, Periyar Tiger Reserve in Kerala ranked first among all tiger reserves in India. Achieving an

outstanding MEE score, Periyar demonstrated superior performance in habitat protection, community eco-development, anti-poaching measures, and scientific management practices.

167. (D) Very Good
In the 5th cycle report of the Management Effectiveness Evaluation of Tiger Reserves, Uttar Pradesh's Dudhwa Tiger Reserve was placed in the "Very Good" performance category. This evaluation recognized Dudhwa's management efforts in habitat preservation, anti-poaching operations, prey base support, and administrative performance across its core and buffer areas.

168. (D) Dehradun
The Wildlife Institute of India is an autonomous institution under the Ministry of Environment, Forest and Climate Change, headquartered in Dehradun, Uttarakhand. Established in 1982, WII serves as India's premier scientific body conducting wildlife research, capacity building, ecological training, and technical advisory support for tiger and elephant census estimations.

169. (A) Interpol
The Wildlife Crime Control Bureau coordinates closely with Interpol's Environmental Security Programme to combat transnational wildlife crime. Through cross-border intelligence sharing, issuing red notices, and participating in global law enforcement operations, WCCB works with Interpol to dismantle international trafficking syndicates smuggling tiger derivatives, ivory, and endangered species across borders.

170. (B) Ensuring active participation, livelihood security, and support of local communities
The long-term success of Project Tiger and Project Elephant depends on active participation, livelihood security, and stewardship of local communities residing near reserves. Community support built through eco-development initiatives, fair compensation, and participatory conservation reduces human-wildlife conflict and ensures sustainable, long-term protection for wild populations outside isolated protected enclosures.

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CHAPTER 04

Our Environment and Ecological Balance

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1. Which of the following statements most accurately defines an ecosystem?
(A) A large geographical area characterized by specific climate and dominant vegetation
(B) A community of organisms interacting with one another and with their physical environment
(C) A specific geographical region where exclusively endangered species are protected
(D) A theoretical model showing the flow of energy from the sun to plants

2. Ecological balance is best described as a state of dynamic equilibrium within a community of organisms. Which of the following is the most significant natural cause of its disruption?
(A) Regulated ecotourism activities
(B) Natural ecological succession
(C) Traditional multi-cropping agriculture
(D) Large-scale volcanic eruptions and tectonic shifts

3. In a typical forest ecosystem, which of the following organisms primarily acts as a decomposer?
(A) Fungi
(B) Ferns
(C) Herbivorous insects
(D) Small carnivores

4. Which of the following abiotic components is primarily responsible for determining the photoperiodism and seasonal behaviors in flora and fauna?
(A) Soil pH
(B) Atmospheric humidity
(C) Light availability
(D) Water salinity

5. Which of the following represents a standard grazing food chain?
(A) Phytoplankton, zooplankton, small fish, large fish
(B) Dead leaves, woodlouse, garden blackbird
(C) Fallen fruit, earthworm, common frog, snake
(D) Animal carcass, maggots, common frog, hawk

6. How does a detritus food chain fundamentally differ from a grazing food chain?
(A) It begins with primary producers capturing solar energy directly.
(B) It requires a significantly higher number of apex predators to function.
(C) It occurs exclusively in aquatic ecosystems, unlike terrestrial chains.
(D) It begins with dead organic matter rather than living plants.

7. The complex, interconnected network of various food chains in an ecological community is termed as:
(A) Energy pyramid
(B) Food web
(C) Trophic level
(D) Ecological succession

8. Given below are two statements, one labelled as Assertion (A) and the other labelled as Reason (R).
Assertion (A): A food web provides greater stability to an ecosystem than a single linear food chain.
Reason (R): A food web provides alternative pathways for energy flow if one specific species population declines.
Select the correct answer from the codes given below:
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

9. In the context of trophic levels, what is the primary role of a secondary consumer?
(A) To synthesize complex organic compounds from inorganic materials
(B) To consume primary producers directly for energy
(C) To break down complex dead organic matter

into simpler substances
(D) To feed on herbivores for their energy requirements

10. According to Raymond Lindeman's 10 Percent Law, if a primary producer synthesizes 10,000 Joules of energy, how much energy will typically be available to the secondary consumer?
(A) 1,000 Joules
(B) 100 Joules
(C) 10 Joules
(D) 1 Joule

11. Which of the following is the primary reason that natural food chains rarely extend beyond four or five trophic levels?
(A) The physical size of top predators prevents them from hunting smaller prey efficiently.
(B) Massive energy loss at each trophic level leaves insufficient energy for higher levels.
(C) Apex predators are strictly territorial and actively limit their own natural population size.
(D) Active decomposers rapidly break down organisms before they can be consumed by apex species.

12. Consider the following statements regarding the water cycle:
I. Evapotranspiration is a major contributor to atmospheric moisture from forest ecosystems.
II. Infiltration refers to the movement of surface water into the ground to replenish aquifers.
III. Condensation is the process where water vapor absorbs heat to become a gas.
Which of the combinations given above is correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

13. Which process in the carbon cycle is directly responsible for removing carbon dioxide from the atmosphere?
(A) Photosynthesis
(B) Cellular respiration
(C) Decomposition
(D) Combustion of fossil fuels

14. What role do nitrogen-fixing bacteria, such as Rhizobium, play in the nitrogen cycle?
(A) They convert soil nitrates back into atmospheric nitrogen gas completely.
(B) They rapidly break down dead organic matter to release stored carbon.
(C) They convert atmospheric nitrogen into ammonia for plant absorption.
(D) They synthesize proteins directly from atmospheric nitrogen for herbivore consumption.

15. The conversion of ammonia to nitrites and then to nitrates by soil bacteria is known as:
(A) Denitrification
(B) Ammonification
(C) Nitrogen assimilation
(D) Nitrification

16. Which of the following ecological pyramids is always upright in any natural ecosystem?
(A) Pyramid of Numbers
(B) Pyramid of Biomass
(C) Pyramid of Energy
(D) Pyramid of Species

17. In a parasitic food chain centered on a single large tree supporting many birds, which in turn support numerous parasites, the Pyramid of Numbers will be:
(A) Upright
(B) Inverted
(C) Spindle-shaped
(D) Horizontal

18. In an aquatic ecosystem such as a pond, the Pyramid of Biomass is typically inverted because:
(A) The top aquatic predators are usually very small in overall physical size compared to producers.
(B) Energy transfer efficiency in aquatic environments is naturally far greater than on land.
(C) Aquatic plants consistently weigh significantly more than all resident aquatic animals.
(D) Phytoplankton have a much lower standing crop biomass than the consumers they support.

19. Which terrestrial ecosystem is characterized by the highest net primary productivity and immense biodiversity?
(A) Tropical Rainforest
(B) Temperate Deciduous Forest
(C) Savanna Grassland
(D) Tundra

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20. Match List I with List II and select the correct answer using the codes given below:

List I: Ecosystem Type

P. Desert Ecosystem
Q. Estuarine Ecosystem
R. Tundra Ecosystem
S. Tropical Rainforest Ecosystem

List II: Dominant Characteristic

1. Mixing of fresh and salt water
2. Permafrost and extremely low temperatures
3. Broad-leaved evergreens and vertical stratification
4. Succulent plants and extreme temperature variations

(A) P-4, Q-1, R-2, S-3
(B) P-1, Q-4, R-3, S-2
(C) P-4, Q-2, R-1, S-3
(D) P-2, Q-1, R-4, S-3

21. Which characteristic is fundamentally distinct about a forest ecosystem compared to a grassland ecosystem?
(A) Forests possess complex vertical stratification like canopy and forest floor.
(B) Forests exhibit a completely flat structural architecture with zero vertical stratification.
(C) Forests do not participate in or contribute to the atmospheric terrestrial carbon cycle.
(D) Forests rely exclusively on detritus pathways while completely lacking grazing food chains.

22. In the context of Uttar Pradesh, the Dudhwa National Park primarily represents which type of forest ecosystem?
(A) Sub-alpine scrub forest
(B) Tropical dry evergreen coastal forest
(C) Tidal mangrove swamp forest
(D) Tropical moist deciduous forest

23. The term "Biodiversity," referring to the variety and variability of life on Earth, was popularized by which sociobiologist?
(A) Ernst Haeckel
(B) Edward O. Wilson
(C) Arthur Tansley
(D) Charles Darwin

24. Consider the following statements regarding the levels of biodiversity:
I. Genetic diversity refers to the variation of genes within a single species.
II. Species diversity refers to the variety of different species found in a particular region.
III. Ecosystem diversity relates to the variety of habitats, biological communities, and ecological processes.
IV. Genetic diversity is irrelevant to the evolutionary survival of a species during environmental changes.
Which of the combinations given above is correct?
(A) I, II, and III only
(B) II, III, and IV only
(C) I, III, and IV only
(D) I, II, III, and IV

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25. Which of the following is NOT one of the recognized criteria for an area to be designated as a "Biodiversity Hotspot" by Conservation International?
(A) It must have at least 1,500 vascular plants as endemics.
(B) It must have 30% or less of its original natural vegetation.
(C) It must be under severe threat of irreversible habitat destruction.
(D) It must lie strictly within equatorial tropical zones.

26. How many global biodiversity hotspots are currently recognized to be partially or completely within the political boundaries of India?
(A) 2
(B) 3
(C) 4
(D) 6

27. The Western Ghats are a major biodiversity hotspot in India. Which of the following faunal species is highly endemic to this region?
(A) Indian Rhinoceros
(B) Lion-tailed Macaque
(C) Snow Leopard
(D) Great Indian Bustard

28. Which of the following best defines "Ecosystem Services"?
(A) The overall financial expenditure required for maintaining state wildlife sanctuaries.
(B) The direct and indirect benefits ecosystems provide for human survival.
(C) The ecological mechanisms by which apex predators control local herbivore populations.
(D) The artificial ecological restoration of degraded forest tracts via human intervention.

29. Under the classification of ecosystem services, the production of food, fresh water, wood, and fiber falls into which category?
(A) Provisioning services
(B) Regulating services
(C) Cultural services
(D) Supporting services

30. Which of the following represents the correct sequence of the categories of ecosystem services as defined by the Millennium Ecosystem Assessment?
(A) Provisioning, Regulating, Cultural, Supporting
(B) Producing, Managing, Aesthetic, Baseline
(C) Primary, Secondary, Tertiary, Quaternary
(D) Economic, Social, Environmental, and Biological

31. The climate control, disease regulation, and water purification provided by a healthy forest ecosystem are examples of:
(A) Provisioning services
(B) Cultural services
(C) Supporting services
(D) Regulating services

32. Bioaccumulation is defined as:
(A) The increase in concentration of a toxic substance at successive trophic levels.
(B) The evolutionary adaptation of a species to toxic environments.
(C) The gradual buildup over time of a chemical in a living organism.
(D) The rapid excretion of heavy metals by aquatic plants.

33. Biomagnification is most commonly observed with which of the following types of substances?
(A) Water-soluble essential micronutrients and vitamins
(B) Fat-soluble, persistent toxins like DDT
(C) Highly biodegradable municipal organic waste matter
(D) Essential dietary amino acids and protein building blocks

34. If a water body is contaminated with a persistent pesticide, which organism in the following aquatic food chain will exhibit the highest concentration of the pesticide due to biomagnification?
(A) Microscopic aquatic phytoplankton
(B) Primary consumer zooplankton
(C) Small plankton-eating forage fish
(D) Fish-eating bird (e.g., Pelican)

35. Consider the following negative impacts of human interference on ecosystems:
I. Habitat fragmentation leading to isolated wildlife populations.
II. Introduction of invasive alien species disrupting native food webs.
III. Overexploitation of natural resources beyond the regeneration capacity.
IV. Controlled afforestation drives with diverse native species.
Which of the combinations given above represents causes of ecological degradation?
(A) I, II, and III only
(B) II, III, and IV only
(C) I, III, and IV only
(D) I, II, III, and IV

36. According to the IUCN Red List, a species is classified as "Endangered" when:
(A) It has not been sighted in its natural wild habitat for over 50 consecutive years.
(B) Its global population remains stable, but its primary natural habitat is completely unprotected.
(C) It faces a very high risk of extinction in the wild soon.
(D) It survives exclusively within captivity in urban zoos and specialized botanical gardens.

37. Which endangered species, serving as a flagship species for conservation, has a dedicated project in India launched in 1973 with several reserves located in Uttar Pradesh, such as Pilibhit and Amangarh?
(A) Bengal Tiger
(B) Asiatic Lion
(C) Indian Elephant
(D) Snow Leopard

38. Given below are two statements, one labelled as Assertion (A) and the other labelled as Reason (R).
Assertion (A): The removal of a keystone species causes a massive disruption or collapse of its ecosystem.
Reason (R): A keystone species is always the most abundant species in an ecosystem in terms of total biomass.
Select the correct answer from the codes given below:
(A) Both Assertion (A) and Reason (R) are true

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and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

39. An excellent example of a keystone species in a forest ecosystem is the fig tree because:
(A) It consistently grows much taller than surrounding canopy trees to monopolize incoming sunlight.
(B) It fruits when other food is scarce, sustaining frugivores.
(C) It aggressively suppresses adjacent competing vegetation by releasing biochemical toxins via allelopathy.
(D) It possesses the absolute highest wood density and structural strength among all tropical forest flora.

40. Primary ecological succession differs from secondary succession primarily because:
(A) Primary succession takes place exclusively within marine or freshwater aquatic environments.
(B) Primary succession requires significantly less total time to establish a mature climax community.
(C) Primary succession begins in sterile areas lacking soil.
(D) Primary succession invariably culminates in a open grassland or savanna climax community.

41. In primary succession on a bare rock surface, which organisms typically function as the pioneer species?
(A) Deep-rooted trees
(B) Perennial grasses
(C) Annual broadleaf weeds
(D) Lichens and mosses

42. Secondary succession would most likely initiate in which of the following areas?
(A) A forest cleared by a severe wildfire
(B) Ocean floor surfaces of newly formed volcanic islands
(C) Rocky terrain exposed by retreating glacier moraines
(D) Bare rock floors inside deep newly formed craters

43. The Biological Diversity Act, 2002 was enacted in India primarily to fulfill the obligations under which international treaty?
(A) United Nations Framework Convention on Climate Change (UNFCCC)
(B) Convention on Biological Diversity (CBD)
(C) Convention on International Trade in Endangered Species (CITES)
(D) Ramsar Convention on Wetlands

44. Under the institutional framework of the Biological Diversity Act, 2002, which body is established at the local self-government (Panchayat/Municipality) level?
(A) National Biodiversity Authority of India (NBA)
(B) Biodiversity Management Committee (BMC)
(C) State Level Biodiversity Board (SBB)
(D) District Forest Conservation Council (DFC)

45. Where is the headquarters of the National Biodiversity Authority (NBA) located in India?
(A) Chennai
(B) New Delhi
(C) Dehradun
(D) Bhopal

46. One of the core functions of the National Biodiversity Authority (NBA) is to ensure equitable sharing of benefits arising from the use of biological resources. This principle is known as:
(A) Resource Hoarding Mechanism
(B) Biopiracy Authorization
(C) Access and Benefit Sharing (ABS)
(D) Intellectual Property Commercialization

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47. Consider the following statements regarding the Biological Diversity Act, 2002:
I. It requires foreign citizens and entities to obtain NBA approval before obtaining any biological resource from India for research.
II. It completely prohibits traditional medical practitioners from using local herbs.
III. It mandates the preparation of People's Biodiversity Registers (PBR) at the local level.
Which of the combinations given above is correct?
(A) I and II only
(B) I and III only
(C) II and III only
(D) I, II, and III

48. In an ecological relationship, when one organism benefits while the other is neither helped nor harmed, the relationship is known as:
(A) Mutualism
(B) Parasitism
(C) Commensalism
(D) Amensalism

49. The relationship between a predator (like a tiger) and its prey (like a deer) is crucial in an ecosystem because:
(A) It inevitably leads to the total and rapid extinction of local prey populations.
(B) It controls prey populations, preventing overgrazing.
(C) It forces surviving members of prey populations to transition into carnivores.
(D) It completely halts all energy flow from herbivores into the detritus food chain.

50. Mycorrhizal association, where fungi help plant roots absorb nutrients and plants provide carbohydrates to the fungi, is a classic example of:
(A) Competition
(B) Predation
(C) Commensalism
(D) Mutualism

51. The ozone layer is a naturally occurring shield located primarily in which layer of the Earth's atmosphere?
(A) Stratosphere
(B) Troposphere
(C) Mesosphere
(D) Thermosphere

52. Chemically, an ozone molecule is composed of:
(A) Two oxygen atoms
(B) One oxygen atom and two hydrogen atoms
(C) Three oxygen atoms
(D) One carbon atom and three oxygen atoms

53. The natural formation of ozone in the upper atmosphere is primarily driven by:
(A) Photolysis of oxygen molecules (O_2) by UV radiation
(B) Thermal chemical reactions between ambient oxygen and atmospheric nitrogen gas
(C) Large-scale evaporation of equatorial ocean water into upper air layers
(D) Direct volcanic outgassing of dense sulfur dioxide into upper troposphere

54. Consider the following atmospheric layers:
1. Mesosphere
2. Troposphere
3. Stratosphere
4. Thermosphere

Which of the following represents the correct sequence of these layers from the Earth's surface upwards?
(A) 2, 3, 1, 4
(B) 3, 2, 1, 4
(C) 2, 1, 3, 4
(D) 1, 2, 3, 4

55. What is the paramount importance of the stratospheric ozone layer to life on Earth?
(A) It traps planetary heat and stabilizes the Earth's surface temperature near 15°C.
(B) It blocks harmful solar UV-B and UV-C radiation.
(C) It completely reflects incoming visible sunlight to prevent excessive global warming.
(D) It supplies essential breathable oxygen gas required by high-altitude migratory birds.

56. The concentration of ozone in the atmosphere is most commonly measured using which unit?
(A) Parts per million (PPM)
(B) Decibel (dB)
(C) Dobson Unit (DU)
(D) Becquerel (Bq)

57. Which highly reactive atom is primarily released from Chlorofluorocarbons (CFCs) under UV radiation and acts as a catalyst to destroy ozone molecules?
(A) Carbon
(B) Fluorine
(C) Hydrogen
(D) Chlorine

58. The chemical mechanism of ozone depletion is considered catalytic because:
(A) One chlorine atom repeatedly destroys thousands of ozone molecules.
(B) The chemical reaction strictly requires continuous thermal heat transfer from lower atmospheric layers.
(C) The process occurs exclusively in the presence of solid metallic dust catalysts like iron or copper.
(D) The reaction continuously generates free oxygen radicals that immediately re-combine into ozone molecules.

59. Consider the following substances:

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I. Chlorofluorocarbons (CFCs)
II. Halons
III. Hydrochlorofluorocarbons (HCFCs)
IV. Carbon dioxide
Which of the combinations given above represents substances strictly categorized as Ozone Depleting Substances (ODS) under international protocols?
(A) I and II only
(B) I, II, and III only
(C) I, III, and IV only
(D) I, II, III, and IV

60. The dramatic seasonal thinning of the ozone layer, commonly referred to as the "Ozone Hole," is most prominently observed over which region?
(A) The Equator
(B) The Antarctic region
(C) The Arctic region
(D) The high Tibetan Plateau

61. The formation of the Antarctic Ozone Hole typically reaches its maximum extent during which time of the year?
(A) September to October (Austral Spring)
(B) January to February (Austral Summer season)
(C) June to July (Austral Winter season)
(D) March to April (Austral Autumn season)

62. Which unique meteorological feature strictly facilitates the extreme ozone depletion over Antarctica by isolating the air and promoting Polar Stratospheric Clouds (PSCs)?
(A) The Intertropical Convergence Zone
(B) The El Niño Southern Oscillation
(C) The Polar Vortex
(D) The Trade Winds

63. Increased exposure to Ultraviolet (UV) radiation at the Earth's surface due to ozone depletion is most strongly linked to an increase in which human health issue?
(A) Chronic pulmonary lung cancer
(B) Acute cardiovascular diseases
(C) Metabolic Type 2 Diabetes mellitus
(D) Skin cancer and cataracts

64. What is a significant negative impact of increased UV-B radiation on the marine ecosystem?
(A) It directly causes global ocean waters to become rapidly and severely acidic.
(B) It dramatically accelerates the growth rates and calcification of tropical coral reefs.
(C) It damages phytoplankton DNA, lowering productivity.
(D) It forces deep-sea marine mammals to permanently migrate toward equatorial regions.

65. Consider the following statements regarding the relationship between ozone depletion and global climate change:
I. Stratospheric ozone depletion is the primary cause of global warming.
II. Many ozone-depleting substances, like CFCs, are also potent greenhouse gases.
III. The cooling of the stratosphere due to greenhouse gases can ironically slow down ozone layer recovery.
Which of the combinations given above is correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

66. The Vienna Convention, adopted in 1985, was a significant milestone because:
(A) It established a legally binding global timeline for the immediate phase-out of all active CFC compounds.
(B) It formally mandated the initial creation and funding of the United Nations Environment Programme (UNEP).
(C) It became the first international treaty to successfully regulate and reduce global greenhouse gas emissions.
(D) It was a framework convention promoting research and cooperation on ozone protection.

67. The Montreal Protocol on Substances that Deplete the Ozone Layer was agreed upon in which year?
(A) 1972
(B) 1985
(C) 1987
(D) 1992

68. Match List I with List II and select the correct answer using the codes given below:
List I: International Protocol/Convention
P. Montreal Protocol
Q. Kyoto Protocol
R. Basel Convention
S. Stockholm Convention
List II: Core Objective
1. Control of transboundary movements of

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hazardous wastes
2. Phase-out of ozone-depleting substances
3. Elimination or restriction of persistent organic pollutants (POPs)
4. Reduction of greenhouse gas emissions

(A) P-2, Q-4, R-1, S-3
(B) P-4, Q-2, R-3, S-1
(C) P-2, Q-1, R-4, S-3
(D) P-1, Q-4, R-2, S-3

69. The primary objective of the Montreal Protocol (1987) is to:
(A) Phase out production and use of ozone-depleting substances
(B) Establish a binding global ban on non-essential plastic manufacturing by 2050
(C) Promote international subsidies for the widespread extraction and use of fossil fuels
(D) Establish legally protected international zones across all global biodiversity hotspots

70. In 2016, an amendment to the Montreal Protocol was adopted to phase down Hydrofluorocarbons (HFCs). What is this amendment known as?
(A) Paris Amendment
(B) Geneva Amendment
(C) Doha Amendment
(D) Kigali Amendment

71. Why was the phase-down of Hydrofluorocarbons (HFCs) necessary, despite them not being ozone-depleting substances?
(A) They are exceptionally toxic to human upper respiratory systems upon inhalation.
(B) They are potent greenhouse gases with high warming potential.
(C) They interact with atmospheric water vapor to cause severe acid rain globally.
(D) They contaminate rainwater and rapidly destroy surrounding terrestrial vegetation.

72. In India, the implementation of the Montreal Protocol is overseen by a dedicated cell under which ministry?
(A) Ministry of Earth Sciences
(B) Ministry of New and Renewable Energy
(C) Ministry of Environment, Forest and Climate Change
(D) Ministry of Science and Technology

73. Which of the following is currently used as a common alternative to CFCs in refrigeration systems because it has zero ozone depletion potential (though it may have global warming potential)?
(A) Halon 1301 fire suppressant
(B) Carbon tetrachloride solvent
(C) Methyl bromide fumigant
(D) Hydrofluorocarbons (HFCs)

74. World Ozone Day is observed globally every year on:
(A) September 16
(B) June 5
(C) April 22
(D) March 21

75. Consider the following milestones related to the ozone layer:
I. Discovery of the Antarctic Ozone Hole.
II. Adoption of the Vienna Convention.
III. Signing of the Montreal Protocol.
IV. Adoption of the Kigali Amendment.
Which combination represents the correct chronological order of these events?
(A) I, II, III, IV
(B) II, I, III, IV
(C) II, III, I, IV
(D) I, III, II, IV

76. By broad definition, "waste" is best described as:
(A) Any natural organic material that biodegrades under standard ambient soil conditions.
(B) Any material or object discarded by its holder.
(C) Any specialized chemical or physical by-product derived strictly from heavy industrial manufacturing.
(D) Any non-organic discarded material that cannot be effectively recycled under any technical circumstances.

77. Waste is typically classified based on its source. Municipal Solid Waste (MSW) primarily originates from:
(A) Urban households, shops, and local institutions
(B) Large-scale subterranean and surface mining extraction operations
(C) Heavy chemical refining and synthetic manufacturing industrial complexes
(D) Commercial agricultural crop fields and large-scale agro-processing business units

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78. Given below are two statements, one labelled as Assertion (A) and the other labelled as Reason (R).
Assertion (A): Proper solid waste management is an urgent necessity in rapidly urbanizing states like Uttar Pradesh.
Reason (R): Unmanaged solid waste leads to groundwater contamination, spread of vector-borne diseases, and emission of landfill gases like methane.
Select the correct answer from the codes given below:
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

79. The fundamental difference between biodegradable and non-biodegradable waste is:
(A) Biodegradable waste exists exclusively in solid state, whereas non-biodegradable waste is strictly liquid.
(B) Non-biodegradable waste is inherently non-toxic to ecosystems, unlike rapidly rotting biodegradable waste.
(C) Non-biodegradable waste rapidly decomposes to produce exceptionally high quantities of organic compost.
(D) Microorganisms break down biodegradable waste, but not non-biodegradable waste.

80. Consider the following waste materials:
1. Plastic bottles
2. Vegetable peels
3. Cotton cloth
4. Leather shoes
Which of the following represents the correct sequence of their typical decomposition time in a natural environment, from the fastest to the slowest?
(A) 2, 3, 4, 1
(B) 2, 4, 3, 1
(C) 3, 2, 4, 1
(D) 2, 3, 1, 4

81. Which of the following is an example of agricultural waste?
(A) Discarded electronic smartphones and computing devices
(B) Crop stubble, husks, and animal manure
(C) Industrial coal fly ash and heavy metallurgical slag
(D) Used medical syringes, needles, and clinical bandages

82. Consider the following statements regarding Electronic Waste (E-waste):
I. E-waste encompasses discarded electrical or electronic devices, including computers, TVs, and mobile phones.
II. E-waste poses no significant environmental threat because it primarily consists of inert plastics.
III. Improper dismantling of e-waste can release heavy metals like lead, mercury, and cadmium into the environment.
Which of the combinations given above is correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

83. Under the E-Waste (Management) Rules in India, the principle of Extended Producer Responsibility (EPR) mandates that:
(A) Producers must ensure safe collection and recycling of end-of-life electronics.
(B) Consumers bear the complete legal and financial responsibility for recycling any electronics they purchase.
(C) Local municipal corporations must bear the entire administrative and operational cost of e-waste recycling.
(D) E-waste generated domestically must be legally exported to developing countries for final offshore disposal.

84. Bio-medical waste generated in hospitals and clinics primarily requires specialized disposal methods to prevent:
(A) The large-scale atmospheric release of gaseous ozone-depleting substances
(B) The rapid marine bioaccumulation and biomagnification of synthetic microplastics
(C) Spread of infectious diseases and toxic chemical contamination
(D) The long-term loss and permanent depletion of soil fertility in agricultural lands

85. Given below are two statements, one labelled as Assertion (A) and the other labelled as Reason (R).
Assertion (A): Incineration is a commonly used method for the final disposal of specific categories of bio-medical waste, such as human

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anatomical waste.
Reason (R): Incineration completely destroys pathogens by burning the waste at very high temperatures.
Select the correct answer from the codes given below:
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

86. According to Bio-Medical Waste Management Rules, which color-coded bin is exclusively used for disposing of sharp waste like needles, scalpels, and blades?
(A) Non-chlorinated yellow plastic bin
(B) Recyclable red plastic container
(C) Puncture-resistant blue glass bin
(D) White puncture-proof container

87. Under the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, what qualifies waste as "hazardous"?
(A) Any commercial waste generated in an operational quantity exceeding 100 kg per day.
(B) Waste exhibiting toxic, flammable, corrosive, or reactive properties.
(C) Any organic municipal solid waste that is wet and produces a strong foul odor.
(D) Waste that is entirely composed of non-hazardous agricultural and plant residues.

88. In hazardous waste disposal, what is the primary purpose of a "Secured Landfill" as opposed to an open dump?
(A) To allow local informal communities to easily access dumped waste for informal scavenging.
(B) To significantly accelerate the natural aerobic biological decomposition of heavy metals.
(C) To prevent toxic leachate from contaminating groundwater via impermeable liners.
(D) To clear and prepare the landfill surface site immediately for commercial agricultural farming.

89. A crucial provision of the Solid Waste Management Rules, 2016 states that waste generators must:
(A) Burn all generated waste directly on their private premises to reduce municipal collection burden.
(B) Dump all unsegregated liquid and solid waste into the nearest river channel for natural dilution.
(C) Pay local informal scrap dealers to dispose of all unsegregated mixed waste completely in secret.
(D) Segregate waste at source into distinct streams before disposal.

90. According to the Solid Waste Management Rules, 2016, what are the three basic categories for source segregation of waste?
(A) Wet, Dry, and Domestic Hazardous Waste
(B) Large Industrial, Agricultural, and Commercial Waste
(C) Heavy Solid, Light Recyclable, and Liquid Waste
(D) Electronic Waste, Bio-medical Waste, and Nuclear Waste

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91. In the context of waste management in Uttar Pradesh, cities like Indore (MP) are often cited as models for cleanliness. What is the most critical first step these successful models implement?
(A) Large-scale thermal incineration of unsegregated mixed waste
(B) 100% door-to-door collection with source segregation
(C) Strictly banning all forms of plastic and commercial packaging
(D) Exporting all municipal solid waste directly to neighboring rural districts

92. The process of converting wet municipal organic waste into nutrient-rich fertilizer using earthworms is called:
(A) Landfilling
(B) Vermicomposting
(C) Pyrolysis
(D) Biomethanation

93. What is the central philosophy of the 3R principle in waste management?
(A) Reduce, Reuse, Recycle
(B) Record, Report, React
(C) Recover, Replace, Restrict
(D) Reburn, Release, Repurpose

94. Consider the following actions:
I. Carrying a reusable cloth bag for grocery shopping.
II. Melting down old glass bottles to manufacture

new glass products.
III. Buying products with minimal or no packaging.
IV. Using an empty jam jar to store spices.
Which of the combinations given above correctly pairs the action with its corresponding 'R' principle?
(A) I and III correspond to Reduce
(B) II corresponds directly to Reuse
(C) IV corresponds directly to Recycle
(D) III corresponds directly to Reuse

95. Match List I with List II and select the correct answer using the codes given below:
List I: Waste Management Process
P. Recycling
Q. Composting
R. Landfilling
S. Incineration
List II: Description
1. Burning of waste at high temperatures
2. Disposing of waste in designated engineered ground pits
3. Biological decomposition of organic waste
4. Processing discarded materials to create new raw materials
(A) P-4, Q-3, R-2, S-1
(B) P-1, Q-2, R-3, S-4
(C) P-3, Q-4, R-1, S-2
(D) P-4, Q-2, R-3, S-1

96. Which step in the 3R hierarchy is considered the most preferred and effective method for minimizing environmental impact?
(A) Recycle
(B) Reuse
(C) Reduce
(D) Recover

97. If a candidate uses both sides of a sheet of paper to write notes instead of using a new sheet, they are primarily practicing which principle?
(A) Reduce
(B) Reuse
(C) Recycle
(D) Refuse

98. An ecosystem relies heavily on biogeochemical cycles. Why are these cycles termed "biogeochemical"?
(A) Because they strictly produce essential biochemical compounds required for modern medicine.
(B) Because they occur exclusively within the Earth's geological crust without atmospheric exchange.
(C) Because they completely replace the fundamental physical laws of nature with biological rules.
(D) They involve biological, geological, and chemical processes to circulate elements.

99. The largest reservoir of carbon in the global carbon cycle is found in:
(A) The oceans
(B) The terrestrial biosphere (forests)
(C) The atmosphere
(D) Fossil fuel reserves underground

100. Match List I with List II and select the correct answer using the codes given below:
List I: Trophic Component
P. Primary Producer
Q. Primary Consumer
R. Secondary Consumer
S. Tertiary Consumer
List II: Example Organism
1. Grasshopper
2. Frog
3. Snake
4. Grass
(A) P-4, Q-1, R-2, S-3
(B) P-1, Q-4, R-3, S-2
(C) P-4, Q-2, R-1, S-3
(D) P-3, Q-2, R-1, S-4

101. Which term describes the rate at which photosynthetic organisms produce organic compounds in an ecosystem?
(A) Gross primary productivity
(B) Secondary ecosystem productivity
(C) Net primary productivity
(D) Ecological efficiency

102. Net Primary Productivity (NPP) is mathematically represented as Gross Primary Productivity (GPP) minus:
(A) Energy lost during mechanical digestion by primary consumers
(B) Total thermal energy lost as heat directly from the topsoil
(C) Total energy transferred directly to soil detritivores
(D) Energy lost through plant respiration (R)

103. In ecology, what does the term 'standing crop' refer to?
(A) The total overall yield of agricultural crops

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harvested by humans within a single calendar year.
(B) Total living biomass at a trophic level at a specific time.
(C) The concentration and overall mass of inorganic soil nutrients present within a given land area.
(D) The absolute total numerical count of primary producers existing within a local food web.

104. Which biogeochemical cycle does not have a significant atmospheric component and cycles primarily through rocks, soil, and water?
(A) Carbon cycle
(B) Nitrogen cycle
(C) Phosphorus cycle
(D) Oxygen cycle

105. Consider the following statements regarding the Pyramid of Energy:
I. It takes into account the rate of energy flow at each trophic level.
II. It can be inverted in a highly productive aquatic ecosystem.
III. It perfectly illustrates the 10% law of energy transfer.
Which of the combinations given above is correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

106. In an ecosystem, energy flow is strictly unidirectional, whereas the movement of nutrients is:
(A) Cyclical
(B) Also unidirectional
(C) Bidirectional between producers and the sun
(D) Completely random and unpredictable

107. The presence of dense forest cover in regions like the Terai belt of Uttar Pradesh ensures ecological balance by:
(A) Dramatically maximizing the regional occurrence of seasonal floods
(B) Acting as a carbon sink and regulating local microclimates
(C) Completely eliminating the natural process of organic soil formation
(D) Permanently preventing the percolation of surface rainwater into the ground

108. Given below are two statements, one labelled as Assertion (A) and the other labelled as Reason (R).
Assertion (A): Tropical rainforests possess much higher biodiversity than temperate forests.
Reason (R): Tropical regions have remained relatively undisturbed for millions of years, allowing for greater evolutionary diversification.
Select the correct answer from the codes given below:
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

109. Which among the following is the most significant threat to global biodiversity today?
(A) Habitat loss and fragmentation
(B) Poaching of charismatic megafauna
(C) Climate change
(D) Natural predation

110. A species whose presence and success indicate the overall health and status of its ecosystem is called:
(A) Invasive species
(B) Extinct species
(C) Indicator species
(D) Endemic species

111. The Sarus Crane, the state bird of Uttar Pradesh, is a prime indicator species for which type of ecosystem?
(A) Deep forest ecosystem
(B) Arid desert ecosystem
(C) Alpine meadow ecosystem
(D) Wetland ecosystem

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112. Select the correct sequence of trophic levels in a detritus food chain:
(A) Dead organic matter → Fungi/Bacteria → Detritivores (e.g., Earthworms) → Carnivores
(B) Sunlight → Green plants → Herbivores → Carnivores
(C) Detritivores → Dead organic matter → Carnivores → Fungi
(D) Fungi → Sunlight → Earthworms → Dead organic matter

113. The transition zone between two distinct ecosystems, such as the marshland between

a river and solid ground, often exhibits higher biodiversity. This zone is known as:
(A) Biome
(B) Ecotone
(C) Niche
(D) Habitat

114. The tendency for an ecotone to contain a greater number of species and higher population density than the flanking ecosystems is known as:
(A) The keystone effect
(B) The bottleneck effect
(C) The founder effect
(D) The edge effect

115. Consider the following statements about Ecosystem Services:
I. Pollination of agricultural crops by wild bees is a regulating service.
II. Ecotourism and recreation in natural parks are cultural services.
III. Timber extraction is a supporting service.
IV. Nutrient cycling is a supporting service.
Which of the combinations given above is correct?
(A) I, II, and III only
(B) I, II, and IV only
(C) II, III, and IV only
(D) I, II, III, and IV

116. A species that is restricted to a specific geographic region and found nowhere else in the world is referred to as:
(A) Exotic species
(B) Sympatric species
(C) Endemic species
(D) Relict species

117. Consider the following statements regarding Ozone Depletion:
I. Ozone is formed in the stratosphere when O_2 is split by UV radiation.
II. A single chlorine atom can continuously destroy ozone molecules because it acts as a catalyst.
III. Ozone depletion causes a direct increase in the Earth's surface temperature, leading to global warming.
Which of the combinations given above is correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

118. Which international body provides the scientific assessments of ozone depletion through its regular reports?
(A) World Health Organization (WHO)
(B) International Monetary Fund (IMF)
(C) Intergovernmental Panel on Climate Change (IPCC)
(D) World Meteorological Organization (WMO) and UNEP

119. The 'Ozone Hole' phenomenon was first reported in the 1980s by scientists from which country?
(A) United States (National Aeronautics and Space Administration)
(B) United Kingdom (British Antarctic Survey team)
(C) Soviet Union (Arctic and Antarctic Research Institute)
(D) Japan (National Institute of Polar Research)

120. Which of the following describes the correct order of events leading to ozone depletion over Antarctica?
(A) Polar vortex forms → Polar stratospheric clouds form → CFCs release chlorine → Sun returns in spring → Chlorine destroys ozone
(B) Sun returns in spring → Polar vortex forms → Chlorine is released → Polar stratospheric clouds form
(C) CFCs release chlorine → Sun returns in spring → Polar vortex forms → Polar stratospheric clouds form
(D) Polar stratospheric clouds form → Sun returns in spring → Polar vortex forms → CFCs release chlorine

121. In India, the 'Ozone Cell' operates under the Ministry of Environment, Forest and Climate Change. What is its primary mandate?
(A) To strictly monitor atmospheric air pollution indices across major metropolitan cities.
(B) To regulate industrial emissions of carbon dioxide gas specifically from coal power plants.
(C) To enforce the national administrative provisions of the Biological Diversity Act.
(D) To implement the Montreal Protocol and phase out ODS.

122. Among the following, which gas is NOT considered an Ozone Depleting Substance (ODS)?
(A) Sulfur hexafluoride
(B) Carbon tetrachloride

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(C) Methyl chloroform
(D) Halon-1211

123. The gradual transition of a biological community over time, progressing towards a stable climax community, is governed by:
(A) Sudden genetic mutations
(B) Ecological succession
(C) Competitive exclusion principle
(D) Biomagnification

124. In a climax community resulting from ecological succession, which of the following characteristics is typically observed?
(A) Exceptionally high net primary productivity coupled with very low overall species diversity
(B) Complex food web, high biomass, and species stability
(C) Exclusively small-sized microscopic organisms characterized by extremely rapid life cycles
(D) Complete dominance of a single opportunistic primary pioneer species across the ecosystem

125. Given below are two statements, one labelled as Assertion (A) and the other labelled as Reason (R).
Assertion (A): The genetic diversity within a single crop species, like rice, is vital for long-term food security.
Reason (R): High genetic diversity provides a wider gene pool, offering natural resistance against changing climates and new diseases.
Select the correct answer from the codes given below:
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

126. The extinction of the Dodo bird is a classic historical example of biodiversity loss primarily driven by:
(A) Catastrophic global climate shifts following a massive meteorite impact event
(B) Rapid long-term atmospheric climate change and shifting weather patterns
(C) Overexploitation and alien species introduction
(D) Progressive habitat turnover caused by natural ecological succession processes

127. In the context of waste management, which of the following constitutes an 'e-waste' hazard when improperly dismantled?
(A) Leaching of cellulose from paper boards
(B) Emission of chlorofluorocarbons from all old wooden furniture
(C) Release of bio-hazardous pathogens
(D) Release of brominated flame retardants and heavy metals

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128. According to the Solid Waste Management Rules, 2016, what is the specific responsibility of a "brand owner" or manufacturer of non-biodegradable packaging?
(A) They are fully exempt from waste management regulations provided their product packaging is visually attractive.
(B) They must pay double property taxes directly to the municipal authority for all industrial operations.
(C) Collect back packaging waste generated by their products.
(D) They are held legally responsible only if the packaging material is scientifically proven to be toxic or poisonous.

129. Consider the following characteristics of a good solid waste management strategy:
I. Promoting decentralized composting of wet waste at the community level.
II. Encouraging the use of single-use plastics to ensure hygiene.
III. Imposing user fees on waste generators to sustain collection mechanisms.
IV. Integrating informal waste pickers (ragpickers) into the formal waste management system.
Which of the combinations given above represents sustainable practices?
(A) I, II, and III only
(B) I, III, and IV only
(C) II, III, and IV only
(D) I, II, III, and IV

130. A critical difference between recycling and reusing is that:
(A) Reusing requires significant industrial energy to re-manufacture materials, whereas recycling requires zero input energy.
(B) Recycling is an officially recognized part of the international 3R framework, whereas reusing is completely excluded.
(C) Reusing is exclusively applicable to wet organic waste matter, whereas recycling

applies solely to non-biodegradable plastics.
(D) Recycling processes waste into new material; reusing uses items as-is.

131. Which of the following materials has the highest recycling potential and can theoretically be recycled indefinitely without loss of quality?
(A) Glass and Aluminum
(B) Paper
(C) Cardboard
(D) Mixed rigid plastics

132. What is the primary purpose of adding a layer of daily soil cover in a sanitary landfill operation?
(A) To provide immediate organic nutrient enrichment for commercial agricultural crops planted directly on top.
(B) To completely neutralize the chemical toxicity of all underlying hazardous industrial waste materials.
(C) To reduce odor, prevent windblown litter, and deter pests.
(D) To dramatically improve the surface aesthetic appeal of the facility to encourage regional eco-tourism.

133. The gas most abundantly produced in anaerobic conditions within a municipal solid waste landfill, which can be captured for energy, is:
(A) Methane
(B) Carbon monoxide
(C) Sulfur dioxide
(D) Nitrogen dioxide

134. Which of the following is considered a cultural ecosystem service?
(A) The physical prevention and mitigation of topsoil erosion by deep root systems of trees.
(B) The biochemical synthesis of valuable therapeutic medicinal compounds from diverse forest herbs.
(C) The natural filtration and purification of surface freshwater as it slowly percolates through soil layers.
(D) Spiritual, recreational, and aesthetic nature benefits.

135. The concept of "biomagnification" is a direct consequence of which principle of the food chain?
(A) Total living organism biomass increases exponentially at each successive higher trophic level in food chains.
(B) Non-metabolized toxins concentrate in organisms as biomass decreases at higher trophic levels.
(C) Apex predatory organisms naturally absorb airborne synthetic chemicals directly from ambient air much faster than herbivores.
(D) Primary producers like green plants possess a complete physiological immunity to all bio-accumulative toxic substances.

136. Which biological phenomenon explains why predatory birds like the bald eagle suffered severe eggshell thinning due to DDT exposure in the 20th century?
(A) Bioaccumulation only
(B) Competitive exclusion
(C) Biomagnification
(D) Natural genetic mutation

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137. Which of the following ecological relationships is best described as competition?
(A) A parasitic intestinal tapeworm extracting vital nutrients while inhabiting the digestive tract of a mammal.
(B) An epiphytic wild orchid growing harmlessly upon the outer bark of a mature tropical mango tree branch.
(C) A worker honeybee actively collecting pollen and nectar from an expanded angiosperm flower structure.
(D) Two bird species eating the same seeds in one tree.

138. Match List I with List II and select the correct answer using the codes given below:
List I: Ecological Term
P. Amensalism
Q. Predation
R. Parasitism
S. Commensalism
List II: Definition
1. One organism benefits, the other is harmed but usually not killed immediately
2. One organism kills and eats another
3. One organism is harmed, the other is unaffected
4. One organism benefits, the other is neither helped nor harmed
(A) P-3, Q-2, R-1, S-4
(B) P-1, Q-2, R-3, S-4
(C) P-3, Q-1, R-2, S-4
(D) P-4, Q-2, R-1, S-3

139. In the context of biodiversity conservation in Uttar Pradesh, the 'Katarniaghat Wildlife

Sanctuary' is crucial for the protection of which aquatic species?
(A) Marine Dugong (sea cow)
(B) Gharial (Gavialis gangeticus)
(C) Olive Ridley sea turtle
(D) Great Blue Whale species

140. Consider the following statements about the Biological Diversity Act, 2002:
I. It aims at conservation of biological diversity.
II. It promotes sustainable use of its components.
III. It facilitates fair and equitable sharing of benefits from genetic resources.
IV. It establishes the National Green Tribunal.
Which of the combinations given above is correct?
(A) I, II, and IV only
(B) I, III, and IV only
(C) I, II, and III only
(D) I, II, III, and IV

141. The primary threat to species that are highly specialized and occupy very narrow ecological niches is:
(A) Inability to adapt to sudden habitat changes.
(B) Exceptionally high reproductive rate leading to localized ecological resource depletion.
(C) Rapid natural tendency to undergo spontaneous genetic mutations into entirely new species.
(D) Complete physiological immunity and universal natural resistance to all known viral diseases.

142. Consider the following steps of the solid waste management process:
1. Transportation
2. Source Segregation
3. Treatment and Final Disposal
4. Door-to-door Collection
Which of the following represents the correct logical sequence of these steps?
(A) 2, 4, 1, 3
(B) 4, 2, 1, 3
(C) 2, 1, 4, 3
(D) 1, 2, 4, 3

143. Which of the following categories of waste is explicitly banned from being burned in open areas or open dumps due to the emission of highly toxic dioxins and furans?
(A) Accumulated dry garden leaf litter and lawn trimmings
(B) Leftover seasonal crop agricultural stubble and field residues
(C) Clean untreated scrap wood timber and forestry waste
(D) Unsegregated municipal waste with PVC plastics.

144. The presence of excess nitrates and phosphates in a lake ecosystem typically leads to rapid algal growth, oxygen depletion, and death of aquatic life. This process is known as:
(A) Bioaccumulation
(B) Succession
(C) Eutrophication
(D) Denitrification

145. Consider the following components:
I. Air
II. Decomposers
III. Soil minerals
Which of these are classified as abiotic components of an ecosystem?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

146. Which fundamental ecological concept states that two species competing for the exact same limited resource cannot coexist at constant population values?
(A) Raymond Lindeman's 10 Percent Law of Energy
(B) Principle of Maximum Sustainable Yield
(C) Shelford's Ecological Law of Tolerance
(D) Competitive Exclusion Principle (Gause's Law)

147. What makes the presence of the ozone layer in the stratosphere beneficial, whereas ozone in the troposphere is considered a pollutant?
(A) Tropospheric ozone harms organisms and causes smog.
(B) Tropospheric ozone reacts chemically with greenhouse gases to rapidly freeze the ambient lower atmosphere.
(C) Stratospheric ozone continuously produces breathable oxygen gas vital for passengers in high-altitude airplanes.
(D) There is zero ecological difference; ozone gas is universally toxic and harmful everywhere in the atmosphere.

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148. Given below are two statements, one labelled as Assertion (A) and the other labelled as Reason (R).
Assertion (A): The use of chemical fertilizers containing excess nitrogen alters the natural nitrogen cycle.
Reason (R): It leads to the accumulation of reactive nitrogen in the environment, contributing to water pollution and greenhouse gas emissions (like nitrous oxide).
Select the correct answer from the codes given below:
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

149. Why is the preservation of biodiversity crucial for ecological stability?
(A) Intricate food webs from biodiversity boost ecosystem resilience.
(B) Higher biodiversity ensures that dominant apex predators are rapidly and naturally eliminated from the system.
(C) Higher biodiversity continuously reduces and limits the total gross primary productivity of the entire region.
(D) High biodiversity completely halts and permanently stops the natural progression of ecological succession.

150. "Project Elephant" was launched by the Government of India in which year to provide financial and technical support to major elephant bearing states, including Uttar Pradesh?
(A) 1973
(B) 1980
(C) 1992
(D) 2002

151. Which of the following correctly pairs an ecosystem with its typical primary producer?
(A) Terrestrial grassland ecosystem – Predatory apex lions
(B) Aquatic marine ecosystem – Microscopic phytoplankton
(C) Terrestrial forest ecosystem – Soil decomposing fungi
(D) Arid desert ecosystem – Subterranean earthworms

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152. Consider the following statements regarding Ozone:
I. Ozone is a pale blue gas with a distinctively pungent smell.
II. In the stratosphere, ozone creation and destruction are naturally in balance through the Chapman cycle.
III. UV-A is completely absorbed by the ozone layer, while UV-C easily reaches the Earth's surface.
Which of the combinations given above is correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

153. A "Biodiversity Heritage Site" (BHS) in India can be notified under the provisions of the Biological Diversity Act, 2002 by:
(A) The United Nations Environment Programme
(B) The Central Government directly bypassing state authorities
(C) Non-Governmental Organizations (NGOs) independently
(D) The State Government in consultation with local bodies

154. What is the fundamental role of "Decomposers" in biogeochemical cycling?
(A) They recycle nutrients from dead organic matter to soil.
(B) They directly synthesize complex organic matter from free atmospheric gases using specialized chemosynthesis.
(C) They convert incoming solar radiant energy directly into stored chemical bond energy within primary tissues.
(D) They permanently prevent and block the atmospheric release of gaseous carbon dioxide during active decay.

155. Which of the following is NOT an objective of the Convention on Biological Diversity (CBD)?
(A) Conservation of biological diversity
(B) Establishing a single global currency for trading biological materials
(C) Sustainable use of the components of biological diversity
(D) Fair and equitable sharing of the benefits arising out of the utilization of genetic resources

156. In an ecosystem, which organisms occupy the first trophic level?
(A) Primary herbivores
(B) Primary producers
(C) Apex carnivores
(D) Soil scavengers

157. Which of the following human activities directly disrupts the carbon cycle the most?
(A) The burning of fossil fuels
(B) Organic farming
(C) Rainwater harvesting
(D) Using bicycles for transport

158. The 'Red Data Book', which documents endangered and rare species of flora and fauna, is published by:
(A) UNEP
(B) WWF
(C) IUCN
(D) CITES

159. Identify the odd one out from the following list of waste materials based on biodegradability:
(A) Banana peel
(B) Dead leaves
(C) Leftover cooked food
(D) Polythene bag

160. Match List I with List II and select the correct answer using the codes given below:
List I: Type of Waste
P. Kitchen wet waste
Q. Used batteries
R. Infectious surgical cotton
S. Old newspapers
List II: Best Disposal/Management Method
1. Recycling
2. Hazardous waste processing facility
3. Composting
4. Bio-medical waste incineration
(A) P-3, Q-2, R-4, S-1
(B) P-1, Q-4, R-2, S-3
(C) P-3, Q-4, R-2, S-1
(D) P-2, Q-3, R-1, S-4

161. An area is protected under the Wildlife (Protection) Act, 1972 in India. Which status provides the highest degree of legal protection with minimal human interference?
(A) Biosphere Reserve Buffer Zone
(B) National Park
(C) Wildlife Sanctuary
(D) Conservation Reserve

162. The 'Ozone Depleting Potential' (ODP) of a chemical is measured relative to which standard substance, which is assigned an ODP of 1.0?
(A) Carbon dioxide gas
(B) Methane gas
(C) Nitrous oxide gas
(D) CFC-11

163. The primary reason for managing and treating industrial effluents before discharging them into a river ecosystem is to:
(A) Prevent toxic chemicals from harming aquatic life and bioaccumulating.
(B) Significantly increase ambient water temperatures to promote tropical river life.
(C) Enhance the visual aesthetic surface flow and clarity of the natural river channel.
(D) Ensure river water depth and velocity are ideal for large commercial vessel navigation.

164. Consider the following strategies for solid waste management:
I. Encouraging the design of products that last longer and can be repaired.
II. Promoting single-use disposable items for convenience.
III. Establishing decentralized waste processing facilities like biomethanation plants.
IV. Implementing Extended Producer Responsibility (EPR) for packaging.
Which combination of strategies is aligned with the 3R principle and sustainable management?
(A) I, II, and III only
(B) I, III, and IV only
(C) II, III, and IV only
(D) I, II, and IV only

165. What is the most significant environmental concern associated with the disposal of electronic waste (e-waste) in informal sectors (like backyard burning)?
(A) Severe worker health hazards and release of toxic fumes.
(B) The widespread atmospheric emission of pleasant-smelling organic aroma compounds.
(C) The rapid artificial creation and stabilization of beneficial atmospheric ozone molecules.
(D) The unexpected generation of exceptionally high-grade agricultural organic compost material.

166. A small piece of plastic less than 5 mm in length, which is a major pollutant resulting from the

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breakdown of larger plastic wastes in aquatic ecosystems, is known as:
(A) Macroplastic
(B) Nanotube
(C) Polymer dust
(D) Microplastic

167. Which of the following best represents the concept of a "Circular Economy" in waste management?
(A) Extract raw primary materials, manufacture products, consume them, and dump residuals in landfills.
(B) Eliminate waste, keep materials in use, and regenerate nature.
(C) Export all domestically generated municipal waste to developing nations in an endless economic cycle.
(D) Thermally incinerate all generated solid waste materials to continuously produce utility electricity.

168. Given below are two statements, one labelled as Assertion (A) and the other labelled as Reason (R).
Assertion (A): Segregation of waste into wet and dry categories at the source is the most critical step in solid waste management.
Reason (R): Mixed waste is highly difficult to sort mechanically, ruins the recyclability of dry waste, and makes composting inefficient.
Select the correct answer from the codes given below:
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

169. Under the Solid Waste Management Rules, 2016, who is primarily responsible for the segregation of waste at source?
(A) The municipal door-to-door waste collector
(B) The local urban municipal corporation authority
(C) The contracted private recycling company facility
(D) The primary waste generator

170. Which of the following correctly describes "upcycling"?
(A) Transforming discarded items into products of higher value.
(B) Industrially breaking down complex manufactured items completely to recover basic raw material inputs.
(C) Thermally burning unsorted municipal waste at ultra-high temperatures to dramatically reduce volume.
(D) Environmentally encapsulating and burying unsegregated hazardous waste deep underground in landfills.

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ANSWERS

1. (B) A community of organisms interacting with one another and with their physical environment
An ecosystem is a structural and functional unit of ecology where living organisms interact with each other and with their surrounding physical environment. It encompasses both biotic components, such as plants, animals, and microorganisms, and abiotic components, including air, water, soil, and climate, working together through energy flow and nutrient cycling.

2. (D) Large-scale volcanic eruptions and tectonic shifts
Ecological balance represents a dynamic state of equilibrium where biological communities remain relatively stable over time. Catastrophic natural events, such as massive volcanic eruptions and major tectonic shifts, cause severe and sudden physical alterations to natural habitats, leading to significant habitat destruction, atmospheric pollution, and major disruption of local food chains.

3. (A) Fungi
Decomposers play a crucial ecological role by breaking down dead organic matter into simpler inorganic substances, thereby returning vital nutrients to the soil. Fungi, along with bacteria, act as primary decomposers in forest ecosystems by secreting extracellular digestive enzymes that decompose complex plant matter, including cellulose and lignin, for nutrient cycling.

4. (C) Light availability
Sunlight availability serves as a critical abiotic factor controlling photoperiodism, which is the physiological response of organisms to the duration of day and night. Light duration directly governs essential biological functions in organisms, including seasonal flowering in plants, reproductive cycles, bird migration, and diurnal animal behavioral patterns across terrestrial ecosystems.

5. (A) Phytoplankton, zooplankton, small fish, large fish
A grazing food chain starts directly with living photosynthetic primary producers that capture solar energy. In aquatic environments, microscopic phytoplankton function as primary producers, which are consumed by herbivorous zooplankton. Subsequently, small carnivorous fish feed on zooplankton, and larger predatory fish consume small fish, demonstrating a classic sequential grazing energy pathway.

6. (D) It begins with dead organic matter rather than living plants.
While a grazing food chain directly initiates with living green autotrophs capturing sunlight, a detritus food chain begins with dead organic matter, decaying plant tissues, or animal remains. Detritivores and decomposer organisms, such as fungi, bacteria, and earthworms, consume this dead material, facilitating essential nutrient recycling and energy transfer.

7. (B) Food web
A food web is an interconnected network of multiple food chains within a natural ecological community. Unlike a simplified linear food chain, a food web illustrates real-world feeding relationships, showing how individual organisms consume and are consumed by various species, thereby providing alternative energy pathways that bolster ecological stability and balance.

8. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Ecosystem stability increases significantly with food web complexity because multiple feeding links prevent total collapse when one population declines. When a specific prey or predator species decreases in number, consumers can readily shift to alternative food sources, ensuring continuous energy flow through alternative pathways, which directly explains the structural resilience.

9. (D) To feed on herbivores for their energy requirements
Trophic levels organize organisms according to their primary energy acquisition methods in a food chain. Secondary consumers occupy the third trophic level and function as carnivores or omnivores that directly feed on herbivorous primary consumers. By consuming herbivores,

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secondary consumers assimilate stored chemical energy and facilitate its transfer upward.

10. (B) 100 Joules
According to Raymond Lindeman's 10 Percent Law, approximately ten percent of energy is transferred from one trophic level to the next higher level. If primary producers synthesize 10,000 Joules, primary consumers receive ten percent, which equals 1,000 Joules. Consequently, secondary consumers receive ten percent of 1,000 Joules, amounting to 100 Joules.

11. (B) Massive energy loss at each trophic level leaves insufficient energy for higher levels.
Energy transfer between adjacent trophic levels is inefficient, with roughly ninety percent lost as metabolic heat, respiration, and waste at each step. Because only about ten percent of usable energy moves up, available energy decreases exponentially, making it bioenergetically impossible to support viable populations of organisms beyond four or five trophic levels.

12. (A) I and II only
Evapotranspiration combines evaporation from soil and transpiration from vegetation, supplying significant atmospheric moisture. Infiltration allows surface water to percolate down through soil layers to recharge subterranean aquifers. However, condensation is the physical process where water vapor loses thermal energy and cools down to transform from a gas into liquid droplets.

13. (A) Photosynthesis
Photosynthesis is the vital biological mechanism through which green plants, algae, and cyanobacteria absorb carbon dioxide from the atmosphere. Using solar radiation energy and water, autotrophs convert inorganic carbon dioxide into organic glucose and oxygen gas, thereby serving as the primary biological process that removes atmospheric carbon and mitigates greenhouse buildup.

14. (C) They convert atmospheric nitrogen into ammonia for plant absorption.
Atmospheric nitrogen gas cannot be assimilated directly by most living organisms. Specialized nitrogen-fixing bacteria, such as Rhizobium found in root nodules of leguminous plants, possess nitrogenase enzymes that reduce inert atmospheric nitrogen into bioavailable ammonia. Plants readily absorb ammonia to synthesize vital biomolecules like proteins, nucleic acids, and amino acids.

15. (D) Nitrification
Nitrification is a two-step aerobic bacterial process in the terrestrial nitrogen cycle. Specialized soil microorganisms known as Nitrosomonas first oxidize toxic ammonia into nitrites. Subsequently, Nitrobacter bacteria oxidize nitrites into nitrates, which are the primary water-soluble inorganic nitrogen compounds easily absorbed and utilized by plant root systems.

16. (C) Pyramid of Energy
The Pyramid of Energy depicts the rate of total energy flow through successive trophic levels per unit area and time. In accordance with the fundamental laws of thermodynamics, energy is continuously dissipated as heat during biological metabolic processes, ensuring that energy available at higher levels is always less than below.

17. (B) Inverted
In a parasitic food chain centered on a single massive producer like a large tree, the numerical count of organisms increases at each consecutive level. A single tree provides food for numerous herbivorous birds, which in turn host thousands of hyper-abundant parasites like lice and fleas, creating an inverted pyramid shape.

18. (D) Phytoplankton have a much lower standing crop biomass than the consumers they support.
Aquatic ecosystems frequently exhibit an inverted biomass pyramid because primary producers like phytoplankton possess an extremely tiny standing crop biomass at any single moment. However, phytoplankton reproduce rapidly and exhibit extraordinarily high turnover rates, producing sufficient productivity to continuously sustain much larger cumulative biomasses of zooplankton and fish consumers.

19. (A) Tropical Rainforest
Tropical rainforest ecosystems experience consistently high temperatures, abundant rainfall, and intense solar radiation throughout the year. These ideal climatic conditions promote continuous year-round plant photosynthesis and growth, resulting in the highest net primary productivity among all terrestrial biomes,

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which supports unmatched species richness and complex vertical structural habitat layers.

20. (A) P-4, Q-1, R-2, S-3
Deserts feature extreme temperature fluctuations and water-retaining succulent plants. Estuarine ecosystems are defined by brackish waters resulting from the mixing of fresh river water and salty ocean tides. Tundra regions feature permanently frozen subsoil known as permafrost, while tropical rainforests are characterized by broad-leaved evergreen trees and intricate canopy stratification.

21. (A) Forests possess complex vertical stratification like canopy and forest floor.
Forest ecosystems are fundamentally distinguished from open grassland ecosystems by their pronounced multi-layered vertical structural design. Trees create distinct horizontal microhabitats, including the emergent layer, dense upper canopy, understory, shrub layer, and organic forest floor. Grasslands completely lack high woody canopy layers, maintaining a simpler, mostly single-layered ground vegetation structure.

22. (D) Tropical moist deciduous forest
Dudhwa National Park, situated in the Terai belt of northern Uttar Pradesh, exemplifies a tropical moist deciduous forest ecosystem. The region features dense Sal forests, tall grassland marshes, and seasonal swamps, supporting rich biodiversity including iconic flagship species such as the Bengal tiger, Indian rhinoceros, swamp deer, and Asian elephant.

23. (B) Edward O. Wilson
Sociobiologist Edward O. Wilson popularized the term "biodiversity" during the mid-1980s to describe the combined total variety of life across all organizational levels. His influential work highlighted genetic variation, species richness, and ecosystem diversity, underscoring the urgent necessity to study and conserve global biological heritage against rising extinction threats.

24. (A) I, II, and III only
Biodiversity is categorized into genetic diversity, species diversity, and ecosystem diversity. Genetic diversity represents the genetic variation within species and is vital for evolutionary survival, enabling populations to adapt to changing environments and emerging diseases. Therefore, describing genetic diversity as irrelevant to evolutionary resilience is scientifically incorrect, validating the remaining statements.

25. (D) It must lie strictly within equatorial tropical zones.
Biodiversity hotspots, conceptualized by Norman Myers, require two strict quantitative criteria: containing at least 1,500 endemic vascular plant species and losing at least 70% of original primary habitat. Hotspots are defined by biological endemism and threat level rather than strict latitude, existing across Mediterranean and temperate zones alongside tropical regions.

26. (C) 4
Four globally recognized biodiversity hotspots extend into Indian territory, harboring high levels of endemic floral and faunal species under severe anthropogenic pressure. These four critical ecological zones comprise the Himalayas, the Western Ghats, the Indo-Burma region, and Sundaland, which encompasses the Nicobar group of islands within the Bay of Bengal.

27. (B) Lion-tailed Macaque
The Lion-tailed Macaque is an arboreal primate strictly endemic to the evergreen rainforest patches of the Western Ghats in Southern India. Threatened by habitat fragmentation and canopy loss, this endangered species serves as an ecological indicator for canopy health and habitat connectivity within this crucial biological hotspot region.

28. (B) The direct and indirect benefits ecosystems provide for human survival.
Ecosystem services are defined as the direct and indirect environmental benefits that healthy, functioning ecosystems continuously supply to human society. These essential services include supplying clean water and food, regulating global climate patterns and flood waters, pollinating agricultural crops, recycling vital nutrients, and offering meaningful recreational and spiritual experiences.

29. (A) Provisioning services
Ecosystem services are classified into four structural functional categories according to international frameworks. Provisioning services encompass all tangible material resources obtained directly from natural ecosystems for human consumption or utilization, including

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food crops, fresh drinking water, timber wood, fuel fibers, genetic materials, and natural biochemical or medicinal compounds.

30. (A) Provisioning, Regulating, Cultural, Supporting
The United Nations Millennium Ecosystem Assessment formally established four standardized categories of ecosystem services. Provisioning services provide tangible physical resources; regulating services manage natural ecological processes; cultural services supply non-material human enrichment and recreation; and supporting services maintain basic foundational processes, such as soil formation, primary production, and nutrient cycling.

31. (D) Regulating services
Regulating services are the natural benefits obtained from the self-regulating mechanisms of ecosystems. Functions such as carbon sequestration for climate moderation, natural biological pest and disease control, water filtration, and flood mitigation by forest vegetation directly regulate environmental conditions to maintain ecological balance and safeguard human health.

32. (C) The gradual buildup over time of a chemical in a living organism.
Bioaccumulation refers to the progressive accumulation and concentration of a chemical, heavy metal, or pollutant within an individual organism over its life span. This process occurs when an organism absorbs a toxic substance from its environment or diet faster than its body can eliminate or metabolize it.

33. (B) Fat-soluble, persistent toxins like DDT
Biomagnification primarily involves lipophilic, non-biodegradable chemical contaminants like synthetic organochlorines and heavy metals. Because these fat-soluble pollutants resist metabolic degradation and environmental breakdown, they accumulate in animal fatty tissues and become progressively concentrated at each successive higher trophic level along food chains.

34. (D) Fish-eating bird (e.g., Pelican)
In biomagnification, non-biodegradable pollutants accumulate at progressively higher concentrations with each ascending trophic level. In aquatic environments, microscopic producers absorb trace chemical concentrations, which are consumed by zooplankton, then small fish, and finally fish-eating birds occupying the apex trophic position, resulting in maximum tissue concentration.

35. (A) I, II, and III only
Habitat fragmentation isolates wild populations, non-native invasive alien species disrupt local food webs, and resource overexploitation severely depletes natural populations, directly causing widespread ecological degradation. Conversely, systematic afforestation using diverse native plant species restores ecosystem balance and degraded soil, making it a positive restoration effort rather than degradation.

36. (C) It faces a very high risk of extinction in the wild soon.
According to criteria established by the International Union for Conservation of Nature Red List, a species is formally designated as Endangered when scientific evaluation demonstrates that it faces an extremely high risk of total extinction in the wild in the immediate future due to population reduction or habitat fragmentation.

37. (A) Bengal Tiger
The Bengal Tiger is a charismatic flagship apex predator whose protection conserves entire forest ecosystems. Project Tiger was officially launched by the Government of India in 1973 to save declining wild populations. Notable tiger reserves protecting crucial habitats within Uttar Pradesh include Pilibhit Tiger Reserve and Amangarh Tiger Reserve.

38. (C) Assertion (A) is true but Reason (R) is false.
Keystone species exert disproportionately large control over ecosystem structure relative to their numerical abundance or total biomass. Removing a keystone species causes trophic cascades and severe community disruption. However, keystone species are rarely the most abundant species in biomass, rendering the assertion correct while the accompanying reason is false.

39. (B) It fruits when other food is scarce, sustaining frugivores.
Tropical fig trees function as classic keystone species because they produce fruit during inter-crop periods when other forest food resources are scarce. By providing vital dietary nourishment

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for birds, bats, primates, and insects during lean seasons, fig trees prevent widespread frugivore mortality and sustain dependent animal populations.

40. (C) Primary succession begins in sterile areas lacking soil.
Primary ecological succession initiates on newly exposed, virtually sterile surfaces completely devoid of pre-existing soil or organic matter, such as cooled lava flows or bare rock surfaces. In contrast, secondary succession occurs on disturbed sites where topsoil and organic seed banks remain intact following events like wildfires.

41. (D) Lichens and mosses
Primary ecological succession on bare rock surfaces is initiated by lichens and mosses acting as pioneer species. Lichens secrete organic acids that weather rock surfaces into fine mineral particles. As lichens decay, they accumulate organic matter, gradually forming initial soil layers necessary for herbaceous plants to take root.

42. (A) A forest cleared by a severe wildfire
Secondary succession begins in previously inhabited areas that experienced severe disturbance but retained nutrient-rich soil and organic matter. A forest cleared by wildfire preserves soil integrity, residual root systems, and seed deposits, allowing plants, grasses, and fast-growing shrubs to rapidly re-establish vegetation cover much faster than primary succession.

43. (B) Convention on Biological Diversity (CBD)
India enacted the Biological Diversity Act in 2002 to fulfill its sovereign international obligations under the United Nations Convention on Biological Diversity signed at the 1992 Rio Earth Summit. The domestic legislation provides a legal framework for biodiversity conservation, sustainable utilization, and equitable access to biological resources.

44. (B) Biodiversity Management Committee (BMC)
The Biological Diversity Act, 2002 establishes a three-tier institutional governance framework in India. At the local self-government level, Gram Panchayats and Municipalities mandate the creation of Biodiversity Management Committees. BMCs promote biodiversity conservation, protect traditional ecological knowledge, and compile comprehensive People's Biodiversity Registers within their jurisdictions.

45. (A) Chennai
The National Biodiversity Authority is an autonomous statutory body established in 2003 under the Ministry of Environment, Forest and Climate Change to implement the Biological Diversity Act, 2002. Headquartered in Chennai, Tamil Nadu, the NBA regulates access to Indian biological resources and oversees equitable benefit-sharing arrangements.

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46. (C) Access and Benefit Sharing (ABS)
Access and Benefit Sharing is a core principle under the Biological Diversity Act and international treaties. It mandates that benefits arising from commercial or research utilization of genetic resources and associated traditional knowledge must be shared equitably with local indigenous communities who serve as traditional custodians of bio-resources.

47. (B) I and III only
The Biological Diversity Act, 2002 requires foreign individuals and commercial entities to obtain prior approval from the National Biodiversity Authority before accessing biological resources. It mandates local preparation of People's Biodiversity Registers while explicitly protecting traditional healers and local communities from unnecessary restrictions regarding domestic bio-resource usage.

48. (C) Commensalism
Commensalism is an interspecific ecological interaction where one organism derives clear biological benefits, such as food, shelter, or transport, while the host species is neither harmed nor helped. Common natural examples include epiphytes growing on forest tree trunks and barnacles attaching to the skin of migrating whales.

49. (B) It controls prey populations, preventing overgrazing.
Predation serves as a critical regulatory ecological mechanism that maintains structural stability within communities. Apex predators control herbivore population numbers, preventing prey species from exploding beyond carrying capacity. By regulating herbivore density, predators prevent vegetation overgrazing, maintaining floral

diversity and safeguarding forest regeneration processes across healthy ecosystems.

50. (D) Mutualism
Mutualism is an obligate or facultative symbiotic relationship where both interacting species derive mutual survival benefits. In mycorrhizal associations, fungal hyphae absorb essential soil minerals like phosphorus and water for plant roots, while host plants supply energy-rich photosynthetic carbohydrates to support fungal metabolic growth and energy needs.

51. (A) Stratosphere
The stratospheric ozone layer is a protective atmospheric envelope concentrated primarily between 15 and 35 kilometers above the Earth's surface. Situated within the stratosphere above the troposphere, this protective layer naturally absorbs intense solar radiation, preserving global climate stability and shielding terrestrial biological organisms from dangerous ultraviolet radiation.

52. (C) Three oxygen atoms
Ozone is a triatomic gas molecule composed chemically of three bound oxygen atoms. Formed when molecular diatomic oxygen combines with reactive singlet oxygen atoms, ozone exists naturally in trace concentrations within the upper atmosphere, exhibiting reactive oxidizing chemical properties distinctly different from standard breathable diatomic oxygen gas.

53. (A) Photolysis of oxygen molecules (O_2) by UV radiation
Natural stratospheric ozone synthesis is driven by photochemical solar reactions. Intense solar ultraviolet radiation cleaves molecular oxygen into two free, highly reactive singlet oxygen radicals. These single oxygen atoms rapidly collide and combine with intact molecular oxygen gases in the presence of neutral catalyst molecules, constantly producing triatomic ozone.

54. (A) 2, 3, 1, 4
The Earth's atmosphere is vertically stratified into distinct structural layers based on thermal characteristics. Ascending directly from the planetary surface upward, the correct sequence begins with the weather-active troposphere, followed by the protective stratosphere, the cold mesosphere, and finally the high-temperature thermosphere extending into outer space boundaries.

55. (B) It blocks harmful solar UV-B and UV-C radiation.
Stratospheric ozone acts as a crucial planetary shield by absorbing high-energy solar ultraviolet radiation, specifically filtering out dangerous UV-B and highly lethal UV-C wavelengths. Protecting terrestrial organisms from excessive UV exposure prevents severe DNA damage, mutation risks, skin cancers, cataracts, and disruption of photosynthetic primary production across ecosystems.

56. (C) Dobson Unit (DU)
Atmospheric ozone layer thickness is measured internationally using Dobson Units. One Dobson Unit represents a pure ozone layer thickness of 0.01 millimeters at standard temperature and pressure. Baseline total column ozone concentrations typically average around 300 Dobson Units, whereas levels falling below 200 Dobson Units define ozone hole conditions.

57. (D) Chlorine
Chlorofluorocarbon molecules drift into the stratosphere, where intense ultraviolet photolysis breaks C-Cl bonds, releasing free chlorine radicals. These highly reactive chlorine atoms interact with ozone molecules, breaking triatomic ozone apart into standard oxygen gas while generating chlorine monoxide, initiating a destructive chain reaction that thin the stratospheric ozone layer.

58. (A) One chlorine atom repeatedly destroys thousands of ozone molecules.
Stratospheric ozone depletion by chlorine is catalytic because chlorine radicals are continuously regenerated throughout the chemical cycle. A single chlorine atom reacts with ozone to form chlorine monoxide and oxygen, and subsequent reactions with atomic oxygen release the original chlorine atom intact, enabling it to destroy up to 100,000 ozone molecules.

59. (B) I, II, and III only
Ozone-depleting substances are synthetic halogenated compounds containing chlorine or bromine that catalytically break down stratospheric ozone. Chlorofluorocarbons, halons, and hydrochlorofluorocarbons represent primary regulated ozone-depleting substances under international agreements. Carbon dioxide

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is a major long-lived greenhouse gas affecting planetary heat balance, but it is not classified as an ODS.

60. (B) The Antarctic region
Severe seasonal thinning of stratospheric ozone occurs most prominently over the Antarctic continent. Extreme winter cold isolates polar stratospheric air within a strong rotating vortex, creating conditions that foster polar stratospheric cloud formation. These clouds provide heterogeneous surfaces that release active chlorine, causing mass ozone depletion during spring.

61. (A) September to October (Austral Spring)
The Antarctic ozone hole develops annually during Austral spring, reaching maximum extent between September and October. As sunlight returns following winter darkness, solar UV photolyzes chlorine compounds stored on polar stratospheric clouds, triggering rapid catalytic destruction of stratospheric ozone before warming air masses disrupt the isolating polar vortex.

62. (C) The Polar Vortex
The Antarctic polar vortex is a powerful winter circulating wind pattern that thermally isolates polar stratospheric air. Temperatures drop below minus eighty degrees Celsius, allowing polar stratospheric clouds to form. These specialized cloud ice particles convert inactive chlorine reservoir species into highly reactive forms, accelerating rapid ozone destruction upon spring sunlight arrival.

63. (D) Skin cancer and cataracts
Depletion of the protective stratospheric ozone layer allows higher fluxes of harmful solar UV-B radiation to reach the surface. Elevated UV-B radiation damages cellular DNA and proteins in human tissue, leading to increased incidences of malignant melanoma, non-melanoma skin cancers, ocular lens damage, cataracts, and suppressed immune system responses.

64. (C) It damages phytoplankton DNA, lowering productivity.
Increased surface ultraviolet-B radiation severely impacts aquatic ecosystems by penetrating upper water layers. High UV-B exposure damages genetic DNA structures and photosynthetic pigments in microscopic phytoplankton, reducing primary photosynthetic productivity and disrupting the foundational base of aquatic food webs, which harms dependent fish and marine populations.

65. (B) II and III only
While stratospheric ozone depletion is not the primary driver of global warming, many ozone-depleting chemical compounds like chlorofluorocarbons function as potent greenhouse gases. Furthermore, greenhouse gas-induced tropospheric warming traps heat near the surface, causing stratospheric cooling that promotes polar stratospheric cloud formation, which indirectly delays stratospheric ozone layer recovery.

66. (D) It was a framework convention promoting research and cooperation on ozone protection.
Adopted in 1985, the Vienna Convention for the Protection of the Ozone Layer served as an international framework treaty designed to foster global scientific research, atmospheric monitoring, and information exchange on stratospheric ozone status. It established fundamental legal frameworks for international environmental cooperation without imposing mandatory emission limits.

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67. (C) 1987
The Montreal Protocol on Substances that Deplete the Ozone Layer was officially agreed upon in September 1987 under the umbrella of the Vienna Convention. Entering into force in 1989, this landmark international environmental agreement established legally binding timelines to control, phase down, and eventually eliminate production and consumption of ODS.

68. (A) P-2, Q-4, R-1, S-3
The Montreal Protocol targets the phase-out of ozone-depleting substances, while the Kyoto Protocol commits industrialized nations to reduce greenhouse gas emissions. The Basel Convention strictly regulates transboundary movements and disposal of hazardous wastes, and the Stockholm Convention works internationally to eliminate or restrict persistent organic pollutants in the environment.

69. (A) Phase out production and use of ozone-depleting substances
The principal objective of the Montreal Protocol (1987) is to protect the stratospheric ozone layer

by systematically phasing out global production and consumption of ozone-depleting substances, including chlorofluorocarbons, halons, and carbon tetrachloride, thereby aiding upper atmospheric recovery and preventing dangerous ultraviolet exposure on Earth.

70. (D) Kigali Amendment
Adopted in Kigali, Rwanda in 2016, the Kigali Amendment legally modified the Montreal Protocol to explicitly include Hydrofluorocarbons within its phase-down mandate. The historic agreement aims to reduce global consumption and production of high-GWP HFCs by over eighty percent over three decades, preventing significant global warming by 2100.

71. (B) They are potent greenhouse gases with high warming potential.
Hydrofluorocarbons were initially introduced as non-ozone-depleting alternatives to chlorofluorocarbons because they contain no chlorine. However, HFCs function as extremely potent greenhouse gases possessing global warming potentials thousands of times higher than carbon dioxide. Phasing them down under international agreements avoids significant temperature increases and mitigates global climate change.

72. (C) Ministry of Environment, Forest and Climate Change
In India, the institutional framework for implementing the Montreal Protocol and managing ozone-depleting substance phase-out programs is managed by the Ozone Cell. Established directly under the Ministry of Environment, Forest and Climate Change, this dedicated unit coordinates national policies, technology transitions, regulatory enforcement, and international reporting commitments.

73. (D) Hydrofluorocarbons (HFCs)
Hydrofluorocarbons lack chlorine atoms, giving them an Ozone Depletion Potential of zero, which led to their widespread adoption as alternative refrigerants replacing ozone-depleting CFCs and HCFCs. However, due to their significant global warming potentials, international efforts now mandate transitioning toward low-GWP natural refrigerants like hydrofluoroolefins and hydrocarbons.

74. (A) September 16
World Ozone Day, officially designated as the International Day for the Preservation of the Ozone Layer, is celebrated globally every year on September 16. Proclaimed by the United Nations General Assembly, this date commemorates the signing of the landmark Montreal Protocol on Substances that Deplete the Ozone Layer in 1987.

75. (B) II, I, III, IV
Chronologically, the Vienna Convention framework was adopted first in 1985. The Antarctic Ozone Hole was discovered and formally published by British Antarctic Survey scientists in May 1985. The landmark Montreal Protocol was subsequently signed in September 1987, and the Kigali Amendment was adopted much later in 2016.

76. (B) Any material or object discarded by its holder.
By broad definition, waste constitutes any material, substance, or byproduct that is discarded, abandoned, or intended to be disposed of by its holder or generator. Waste arises across domestic, commercial, agricultural, and industrial processes, necessitating systematic management strategies to mitigate negative environmental and public health impacts.

77. (A) Urban households, shops, and local institutions
Municipal Solid Waste, commonly called trash or garbage, consists of everyday items discarded by the general public. It primarily originates from residential urban households, commercial shops, offices, market complexes, and local institutions, comprising organic food waste, paper packaging, plastics, textiles, glass, and household consumer trash items.

78. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Effective solid waste management is crucial for rapidly urbanizing regions to maintain public health and environmental safety. Unmanaged solid waste accumulation results in toxic leachate contaminating underground water aquifers, creates breeding sites for vectors carrying diseases like dengue and malaria, and releases hazardous landfill greenhouse gases like methane.

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79. (D) Microorganisms break down biodegradable waste, but not non-biodegradable waste.
The fundamental difference lies in biological decomposability. Biodegradable waste consists of organic material that naturally breaks down into simple compounds through natural enzymatic actions of decomposer microorganisms like bacteria and fungi. Non-biodegradable waste resists microbial decomposition, persisting unchanged in the natural environment for decades or centuries.

80. (A) 2, 3, 4, 1
Decomposition speed depends on chemical structure and microbial accessibility. Vegetable peels decompose fastest within weeks. Natural organic materials like cotton cloth decompose in months, while complex treated materials like leather shoes take several decades. Synthetic plastic bottles resist biological breakdown entirely, requiring hundreds of years to fragment into microplastics.

81. (B) Crop stubble, husks, and animal manure
Agricultural waste includes organic and inorganic residuals generated directly from farming activities and livestock operations. Typical agricultural wastes comprise post-harvest crop stubble, husks, stalks, bagasse, animal manure, poultry litter, and agro-chemical packaging containers, requiring sustainable management practices like composting, biomethanation, or mulching to prevent pollution.

82. (C) I and III only
Electronic waste includes discarded electronic and electrical equipment like computers, mobile phones, and televisions. E-waste presents significant environmental and toxicological hazards because component circuit boards contain heavy metals including lead, mercury, cadmium, and flame retardants, which leach into surrounding soil and water when improperly handled or dismantled.

83. (A) Producers must ensure safe collection and recycling of end-of-life electronics.
Extended Producer Responsibility is a policy approach integrated into environmental governance and waste management rules. EPR mandates that electronics manufacturers and brand producers bear financial and operational responsibility for managing the post-consumer stage of their products, including establishing collection systems, channelization, and environmentally sound recycling infrastructure.

84. (C) Spread of infectious diseases and toxic chemical contamination
Bio-medical waste generated during healthcare diagnoses, treatments, or research comprises infectious items, sharps, anatomical waste, and expired pharmaceuticals. Specialized collection, segregation, and treatment are necessary to neutralize dangerous biological pathogens, prevent hospital-acquired infection spread, stop needle-stick injuries, and avoid chemical contamination of water bodies.

85. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Thermal incineration is an approved treatment method for infectious medical waste categories, including human anatomical waste, animal tissues, and soiled cotton dressings. Operating at high temperatures above 800 degrees Celsius, incinerators completely destroy pathogenic microorganisms, viruses, and biological agents, reducing organic waste into sterile ash.

86. (D) White puncture-proof container
Under the Bio-Medical Waste Management Rules, waste segregation at source relies on color-coded containers. Contaminated waste sharps including needles, scalpels, blades, and fixed-needle syringes must be collected strictly in white, translucent, puncture-proof, leak-proof containers to protect healthcare workers and handlers from accidental injury and viral infections.

87. (B) Waste exhibiting toxic, flammable, corrosive, or reactive properties.
According to environmental regulations, hazardous waste is defined by its inherent chemical or biological properties rather than generated quantity alone. Waste is classified as hazardous if it possesses characteristics such as toxicity, flammability, corrosiveness, reactivity, or infectiousness, posing potential threats to human health and environmental safety.

88. (C) To prevent toxic leachate from contaminating groundwater via impermeable liners.
Unlike unlined open dumps, secured hazardous waste landfills are engineered containment facilities built with impermeable clay and synthetic geomembrane liners. These multi-

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layer barrier systems, paired with leachate collection networks, contain hazardous chemical compounds and prevent toxic liquid leachate from percolating into surrounding soils or contaminating groundwater resources.

89. (D) Segregate waste at source into distinct streams before disposal.
The Solid Waste Management Rules, 2016 legally mandate source segregation across all waste generators. Household and commercial entities must separate generated waste at the point of origin into specific streams before handover to collectors, establishing the foundation for decentralized composting, material recovery, and sustainable waste treatment.

90. (A) Wet, Dry, and Domestic Hazardous Waste
The Solid Waste Management Rules, 2016 specify three primary streams for source segregation by waste generators. These categories comprise wet biodegradable organic waste, dry recyclable waste like plastics and paper, and domestic hazardous waste including discarded paints, pest containers, batteries, solar cells, and expired medical preparations.

91. (B) 100% door-to-door collection with source segregation
Benchmark urban cleanliness models demonstrate that achieving sustainable municipal waste management relies fundamentally on 100% door-to-door waste collection paired strictly with segregation at source. Separating organic wet waste from dry recyclables enables processing of compost while preserving material quality for industrial recycling streams.

92. (B) Vermicomposting
Vermicomposting is a biological waste management process that uses specific earthworm species, such as Eisenia fetida, to break down wet organic waste. Earthworms consume organic garbage and accelerate microbial decomposition, producing nutrient-rich organic castings known as vermicompost, which improves soil fertility, moisture retention, and agricultural structure.

93. (A) Reduce, Reuse, Recycle
The 3R principle forms the foundational hierarchy of modern sustainable waste management practices. "Reduce" focuses on minimizing waste creation at the source, "Reuse" emphasizes utilizing products multiple times without re-manufacturing, and "Recycle" involves processing discarded waste materials to manufacture new usable raw products, reducing environmental impacts.

94. (A) I and III correspond to Reduce
Carrying reusable shopping bags and purchasing products with minimal packaging directly avoid initial waste creation, corresponding to the "Reduce" principle. Re-melting glass bottles to produce new items represents "Recycle", while repurposing an empty glass jar as a spice container illustrates the "Reuse" principle, confirming the classification.

95. (A) P-4, Q-3, R-2, S-1
Waste management techniques utilize distinct physical and biological processes. Recycling processes discarded materials to produce raw inputs, composting involves biological decomposition of wet organic waste into soil enrichers, engineered landfilling buries waste safely within designated lined ground pits, and thermal incineration burns non-recyclable waste at high temperatures.

96. (C) Reduce
Within the 3R waste management hierarchy, "Reduce" is the most effective environmental strategy because avoiding waste generation eliminates environmental burdens associated with resource extraction, industrial manufacturing, transport energy, and downstream waste processing. Source reduction conserves raw natural resources and prevents environmental pollution at its root source.

97. (B) Reuse
Utilizing both sides of a paper sheet maximizes the functional utility of the item in its existing form before discarding or recycling it. This practice exemplifies the "Reuse" principle, extending product lifespans, lowering overall paper consumption rates, and directly reducing industrial demand for virgin wood pulp harvesting.

98. (D) They involve biological, geological, and chemical processes to circulate elements.
Biogeochemical cycles describe pathways by which chemical elements move through biotic biological components and abiotic geological atmospheric domains. The prefix "bio" refers to living organisms, "geo" highlights soil, rock,

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and water reservoirs, and "chemical" denotes elemental transformations, illustrating how essential nutrients continuously circulate across global planetary systems.

99. (A) The oceans
The global ocean constitutes the largest active reservoir of carbon in the planetary carbon cycle. Oceans store massive quantities of dissolved inorganic carbon dioxide, bicarbonate ions, and oceanic biological organic carbon, containing significantly greater amounts of carbon than the atmospheric reservoir, terrestrial vegetation biomass, or active soil organic pools.

100. (A) P-4, Q-1, R-2, S-3
In a terrestrial food chain, photosynthetic grass acts as a primary producer at the first trophic level. Herbivorous grasshoppers consume grass as primary consumers, while insectivorous frogs feed on grasshoppers as secondary consumers. Subsequently, carnivorous snakes eat frogs, functioning as tertiary consumers within higher trophic levels.

101. (A) Gross primary productivity
Gross primary productivity refers to the total rate at which photosynthetic primary producers capture solar radiant energy and synthesize chemical organic compounds per unit area and time. It measures total photosynthetic fixation before accounting for energy expended by autotrophs during cellular respiration to maintain metabolic biological functions.

102. (D) Energy lost through plant respiration (R)
Net Primary Productivity represents the net organic biomass accumulated by autotrophic primary producers that remains available for heterotrophic consumers. Mathematically defined as NPP = GPP - R, it equals total synthesized chemical energy fixed during gross primary productivity minus energy consumed by plants during autotrophic cellular respiration.

103. (B) Total living biomass at a trophic level at a specific time.
Standing crop describes the total amount of living organic matter or biomass present in a specified trophic level or area at a given point in time. Quantified as dry mass or energy unit content per unit area, standing crop reflects instantaneous biological mass rather than dynamic production rates.

104. (C) Phosphorus cycle
The phosphorus cycle is a sedimentary biogeochemical cycle lacking a significant gaseous atmospheric reservoir. Unlike gaseous carbon, nitrogen, and oxygen cycles, phosphorus circulates primarily through weathering of lithospheric phosphate rocks, soil leaching, aquatic runoff, and biological uptake by plants, returning to sedimentary deposits over geological timescales.

105. (C) I and III only
Energy pyramids account for the rate of energy flow per unit area and time across trophic levels, clearly demonstrating the 10 percent energy transfer rule. Because thermodynamic energy loss as heat is unavoidable at every energy conversion step, energy pyramids remain strictly upright across all natural ecosystems.

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106. (A) Cyclical
Energy flows through ecosystems in a strict one-way, unidirectional direction, originating from solar radiation and dissipating continually as metabolic heat. Conversely, chemical nutrients and inorganic elements move in a closed, cyclical pattern, continually cycling between biological organisms and abiotic environmental pools via decomposers and biogeochemical pathways.

107. (B) Acting as a carbon sink and regulating local microclimates
Dense forest tracts in the Terai region perform essential ecological stabilizing functions. High canopy trees capture carbon dioxide through photosynthesis, acting as massive carbon sinks. Forests moderate local microclimates, enhance ambient atmospheric humidity through transpiration, cushion heavy rainfall impacts, promote soil water retention, and mitigate regional flood severity.

108. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Tropical rainforests maintain higher species diversity than temperate forests due to evolutionary stability. Unlike temperate zones affected by historical glaciations, tropical regions experienced millions of years of uninterrupted climatic stability, providing continuous evolutionary opportunities for niche specialization, speciation, and biological diversification, directly explaining elevated species richness.

109. (A) Habitat loss and fragmentation
Habitat loss and fragmentation, driven by expanding agricultural lands, urbanization, deforestation, and industrial development, represents the most significant immediate driver of global biodiversity decline. Destroying natural habitats reduces geographical ranges, isolates animal populations, limits gene flow, and diminishes available ecological resources, accelerating species extinction across biomes.

110. (C) Indicator species
An indicator species is an organism whose presence, population density, behavior, or physiological health directly reflects ambient environmental conditions and ecosystem health. Sensitivities to pollutants or habitat changes make indicator species valuable biological tools for ecological monitoring, allowing early detection of environmental degradation and ecosystem stress.

111. (D) Wetland ecosystem
The Sarus Crane, recognized as the official state bird of Uttar Pradesh, is a flagship indicator species for healthy wetland ecosystems. Requiring intact shallow freshwater marshes and agricultural floodplains for breeding, nesting, and foraging, population trends of Sarus Cranes reflect regional wetland habitat integrity and hydrological health.

112. (A) Dead organic matter → Fungi/Bacteria → Detritivores (e.g., Earthworms) → Carnivores
In a detritus food chain, energy transfers begin with non-living dead organic matter. Saprophytic fungi and bacteria break down complex organic compounds into simpler particles. Invertebrate detritivores like earthworms consume decomposing matter and associated microbes, and are subsequently preyed upon by small carnivores, establishing the energy flow pathway.

113. (B) Ecotone
An ecotone is a distinct ecological transition zone where two adjacent, distinct biological communities meet and integrate. Examples include marshlands between aquatic and terrestrial systems or forest edges bordering grasslands. Ecotones contain unique environmental gradients, hosting species from both overlapping biomes alongside organisms uniquely adapted to transitional zone conditions.

114. (D) The edge effect
The edge effect describes the ecological phenomenon where transition ecotones display greater biodiversity, higher species richness, and elevated population densities compared to adjacent communities. Overlapping resources, microclimatic variability, and habitat structural complexity in boundary zones create diverse ecological niches that support both edge-specialized and overlapping species.

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115. (B) I, II, and IV only
Crop pollination by wild pollinators regulates agricultural reproduction, operating as a regulating service. Ecotourism offers non-material recreational opportunities, functioning as a cultural service. Nutrient cycling maintains foundational ecosystem processes, operating as a supporting service. Timber extraction provides physical biological materials, making it a provisioning service rather than supporting.

116. (C) Endemic species
Endemic species are organisms strictly restricted to a defined geographic region, island, or habitat type, occurring nowhere else naturally on Earth. Endemic species are particularly vulnerable to extinction from habitat disruption or climate change because their entire global distribution is confined within specific localized environmental parameters.

117. (A) I and II only
Photolysis of molecular oxygen by UV radiation forms stratospheric ozone, and chlorine radicals act catalytically to break down thousands of ozone molecules. However, stratospheric ozone depletion allows increased UV-B transmission rather than functioning as the direct primary mechanism of global warming, validating statements I and II.

118. (D) World Meteorological Organization (WMO) and UNEP
Scientific assessments of atmospheric ozone depletion are conducted under the auspices of the World Meteorological Organization and the United Nations Environment Programme. Every four years, international panels of atmospheric scientists publish comprehensive reports evaluating stratospheric ozone health, ODS trends, UV impacts, and recovery trajectories under Montreal Protocol regulations.

119. (B) United Kingdom (British Antarctic Survey team)
The discovery of severe seasonal stratospheric ozone depletion over Antarctica was first published in 1985 by British Antarctic Survey scientists Joe Farman, Brian Gardiner, and Jonathan Shanklin. Ground-based spectrophotometer observations at Halley Bay documented dramatic spring ozone losses, providing crucial empirical evidence that catalyzed international ozone policy.

120. (A) Polar vortex forms → Polar stratospheric clouds form → CFCs release chlorine → Sun returns in spring → Chlorine destroys ozone
Winter Antarctic conditions initiate with the polar vortex isolating stratospheric air masses. Extremely low temperatures form polar stratospheric clouds that host heterogeneous chemical reactions, converting inactive chlorine reservoir compounds into reactive forms. When spring sunlight arrives, photolysis releases reactive chlorine radicals that rapidly destroy ozone molecules in catalytic cycles.

121. (D) To implement the Montreal Protocol and phase out ODS.
The Ozone Cell functions as the specialized administrative unit within India's Ministry of Environment, Forest and Climate Change tasked with managing Montreal Protocol obligations. Its mandate includes overseeing national ODS phase-out projects, regulating chemical imports, offering fiscal incentives for non-ODS technologies, and submitting annual phase-out reports.

122. (A) Sulfur hexafluoride
Carbon tetrachloride, methyl chloroform, and Halon-1211 contain chlorine or bromine atoms, making them recognized ozone-depleting substances. Sulfur hexafluoride contains fluorine and sulfur without chlorine or bromine, giving it an Ozone Depletion Potential of zero. However, sulfur hexafluoride is regulated under climate agreements as a potent greenhouse gas.

123. (B) Ecological succession
Ecological succession is the predictable process of biological community development over time in a given habitat. Starting with pioneer communities, vegetation and fauna modify local environmental conditions, leading through successive transitional seral stages until establishing a stable, self-perpetuating climax community adapted to regional climatic conditions.

124. (B) Complex food web, high biomass, and species stability
A climax community represents the final, stable stage of ecological succession in dynamic equilibrium with regional climate. Climax communities exhibit high total biomass, complex species interactions, broad biodiversity, intricate food webs, and efficient nutrient cycling, maintaining ecological stability unless disrupted by major catastrophic environmental events.

125. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Intra-specific genetic diversity within agricultural crop varieties like rice is vital for long-term food security. Diverse gene pools provide varied traits, including drought tolerance, salinity resistance, and disease immunity. Broad genetic variation enables crops to withstand emerging environmental stresses and pest outbreaks, directly explaining agricultural system resilience.

126. (C) Overexploitation and alien species introduction
The extinction of the flightless Dodo bird on Mauritius during the seventeenth century illustrates human-driven biodiversity loss. Evolutionary isolation rendered Dodos vulnerable to excessive hunting by sailors and predation by introduced invasive species like pigs, dogs, and rats, which destroyed eggs and nests, driving rapid extinction.

127. (D) Release of brominated flame retardants and heavy metals
Improper recycling and open dismantling of electronic waste present hazardous toxic threats. Electronic components contain heavy metals like lead, cadmium, and mercury, alongside brominated flame retardants. Crude processing methods release these persistent contaminants into surrounding soil, groundwater, and air, posing severe public health and environmental risks.

128. (C) Collect back packaging waste generated by their products.
Under the Solid Waste Management Rules, 2016 and Extended Producer Responsibility guidelines, brand owners and packaging manufacturers share statutory obligations for

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managing post-consumer non-biodegradable waste. They must establish collect-back systems to retrieve non-biodegradable packaging waste generated by their products and route materials to authorized recycling facilities.

129. (B) I, III, and IV only
Sustainable solid waste strategies emphasize decentralized composting of organic waste, recovering user fees for operational sustainability, and integrating informal waste collectors into formal municipal collection systems. Promoting single-use plastics increases non-biodegradable pollution, running counter to sustainable waste management guidelines and national reduction mandates.

130. (D) Recycling processes waste into new material; reusing uses items as-is.
The structural difference between recycling and reusing involves material re-manufacturing. Reusing involves utilizing discarded objects repeatedly in their original form without chemical or mechanical altering. Conversely, recycling involves processing discarded items as raw material inputs, melting or breaking them down industrially to manufacture new consumer products.

131. (A) Glass and Aluminum
Glass and aluminum possess exceptionally high circular recycling efficiency, capable of infinite re-melting and re-manufacturing cycles without physical structural degradation or material loss. In contrast, paper and cardboard experience progressive fiber breakdown during processing cycles, limiting total recycling lifespan before structural degradation prevents further processing.

132. (C) To reduce odor, prevent windblown litter, and deter pests.
In sanitary landfill engineering, compacting waste and applying a thin daily soil cover layer serves critical environmental health functions. Soil cover isolates decomposing municipal waste, controlling odor emissions, preventing windblown litter, shielding waste from rainwater infiltration, and deterring disease vectors like flies, mosquitoes, rodents, and birds.

133. (A) Methane
Anaerobic biological decomposition of organic municipal waste within compacted landfill layers produces landfill gas, comprising roughly fifty percent methane and fifty percent carbon dioxide. Capturing flammable methane prevents explosive emissions and atmospheric greenhouse gas releases while offering renewable fuel for thermal heat or electricity generation.

134. (D) Spiritual, recreational, and aesthetic nature benefits.
Cultural ecosystem services represent non-material benefits human societies gain from functioning natural ecosystems. These benefits encompass spiritual inspiration, aesthetic appreciation, cognitive development, tourism, and outdoor educational experiences. Soil erosion control and water filtration represent regulating services, while timber and medicinal harvesting constitute provisioning services.

135. (B) Non-metabolized toxins concentrate in organisms as biomass decreases at higher trophic levels.
Biomagnification results directly from trophic energy loss principles in food chains. Persistent lipophilic toxins are passed up food chains without being metabolized. Because organic biomass decreases progressively at higher trophic levels while chemical contaminant loads persist, toxin concentrations expand exponentially per unit biomass in higher trophic level organisms.

136. (C) Biomagnification
Eggshell thinning in predatory birds like bald eagles and falcons during the mid-twentieth century resulted from biomagnification of synthetic organochlorine insecticides like DDT. Low aquatic pesticide runoff concentrated across trophic levels, reaching high levels in apex fish-eating birds, disrupting calcium metabolism and causing fragile eggshell breakage.

137. (D) Two bird species eating the same seeds in one tree.
Interspecific competition occurs when individuals of different species compete for shared limited environmental resources such as food, space, or light. Two avian species consuming the same seeds on a tree illustrates direct exploitative competition, as resource consumption by one species reduces availability for the other, affecting reproductive fitness.

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138. (A) P-3, Q-2, R-1, S-4
Ecological relationships define biological species interactions. Amensalism involves one species being inhibited while the other remains unaffected. Predation occurs when a predator kills and eats prey. Parasitism involves a parasite benefiting by feeding off a host without immediate death, and commensalism occurs when one organism benefits while the host remains unaffected.

139. (B) Gharial (Gavialis gangeticus)
Katarniaghat Wildlife Sanctuary, located within Uttar Pradesh in the Terai region, plays a major role in conserving the critically endangered Gharial. Sanctuary river stretches along the Girwa River preserve sandbanks and clean flowing river habitats necessary for natural breeding, nesting, and conservation of wild Gharial populations.

140. (C) I, II, and III only
The Biological Diversity Act, 2002 was enacted to promote biodiversity conservation, sustainable resource utilization, and fair benefit-sharing from genetic access. The National Green Tribunal was established separately under the National Green Tribunal Act, 2010 to handle environmental disputes, making statement IV distinct from the Biological Diversity Act.

141. (A) Inability to adapt to sudden habitat changes.
Specialized species occupying narrow ecological niches possess physiological adaptations for specific food sources or habitats. When sudden environmental disturbances or habitat alterations occur, specialist species struggle to adapt or shift dietary dependencies compared to generalists, exposing specialized populations to heightened vulnerability and extinction risks.

142. (A) 2, 4, 1, 3
Systematic solid waste management follows a logical operational flow. The process begins with source segregation by generators into wet and dry streams. Segregated waste is collected through door-to-door collection systems, transported via specialized vehicles to processing facilities, and finally processed through composting, recycling, or sanitary landfill disposal.

143. (D) Unsegregated municipal waste with PVC plastics.
Open burning of unsorted municipal waste containing polyvinyl chloride plastics is legally prohibited under environmental protection rules. Low-temperature combustion of chlorine-containing synthetic polymers releases highly carcinogenic persistent organic pollutants, including polychlorinated dibenzo-p-dioxins and dibenzofurans, posing severe public health hazards and atmospheric toxic contamination.

144. (C) Eutrophication
Eutrophication describes nutrient enrichment of water bodies caused by agricultural fertilizer runoff containing excess nitrates and phosphates. High nutrient levels trigger dense algal blooms that block sunlight penetration. As algae die, aerobic bacterial decomposition consumes dissolved oxygen, creating hypoxic aquatic dead zones that suffocate resident fish species.

145. (C) I and III only
Ecosystems comprise abiotic physical components alongside living biotic organisms. Abiotic factors are non-living physical and chemical elements, including air gases, soil minerals, water, sunlight, and climate parameters. Decomposers are living biological organisms like fungi and bacteria, placing them firmly within biotic component classifications.

146. (D) Competitive Exclusion Principle (Gause's Law)
Gause's Competitive Exclusion Principle states that two sympatric species competing for identical limited resources cannot coexist indefinitely under stable environmental conditions. The species enjoying slight competitive advantages will outcompete and displace the other, forcing the less adapted species toward extinction or evolutionary resource partitioning.

147. (A) Tropospheric ozone harms organisms and causes smog.
Stratospheric ozone provides vital planetary benefits by absorbing harmful solar ultraviolet radiation before it reaches Earth. Conversely, ground-level tropospheric ozone acts as a dangerous air pollutant and toxic secondary oxidant, forming photochemical smog, irritating respiratory systems, damaging pulmonary plant tissues, and reducing agricultural crop yields.

148. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Synthetic chemical fertilizers apply massive reactive nitrogen loads that disrupt natural

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nitrogen cycles. Excess fertilizer application leads to nitrate leaching into water resources, causing aquatic eutrophication, while soil microbial denitrification converts surplus nitrogen into nitrous oxide gas, a powerful long-lived greenhouse gas that accelerates global climate change.

149. (A) Intricate food webs from biodiversity boost ecosystem resilience.
High biological diversity strengthens ecosystem stability and functional resilience against environmental disturbances. Rich species diversity creates complex food webs with multiple overlapping trophic pathways, ensuring that environmental stresses affecting specific species do not trigger ecosystem collapse, as surviving species maintain continuous energy flow and ecological processes.

150. (C) 1992
Project Elephant was launched by the Ministry of Environment and Forests in 1992 as a Centrally Sponsored Scheme. The initiative provides financial and technical assistance to elephant-bearing states, including Uttar Pradesh, to protect Asian elephant populations, manage natural habitats, preserve migration corridors, and mitigate human-elephant conflicts.

151. (B) Aquatic marine ecosystem – Microscopic phytoplankton
Primary producers form the foundational base of ecosystems by fixing solar energy through photosynthesis. In aquatic marine systems, microscopic phytoplankton serve as primary producers. In grasslands, photosynthetic grasses perform primary production, while forest trees anchor forest ecosystems, making aquatic phytoplankton the correct primary producer match.

152. (A) I and II only
Ozone is a light blue gas possessing a pungent odor, maintained naturally in balance through the stratospheric Chapman cycle. However, the ozone layer absorbs harmful UV-C and UV-B radiation while permitting longer wavelength UV-A to reach Earth, making statement III scientifically incorrect and confirming statements I and II.

153. (D) The State Government in consultation with local bodies
Under Section 37 of the Biological Diversity Act, 2002, State Governments hold legal authority to officially notify areas of biodiversity importance as Biodiversity Heritage Sites. Notifications are made in formal consultation with local municipal bodies and Biodiversity Management Committees to conserve unique, ecologically fragile habitats.

154. (A) They recycle nutrients from dead organic matter to soil.
Decomposers including heterotrophic fungi and bacteria drive biogeochemical nutrient cycling. By breaking down complex organic molecules within dead plants and animal waste, decomposers release locked inorganic nutrients like nitrogen, phosphorus, and potassium back into topsoil pools, renewing soil fertility for uptake by primary green producers.

155. (B) Establishing a single global currency for trading biological materials
The United Nations Convention on Biological Diversity establishes three primary objectives: conserving biological diversity, sustainably utilizing its structural components, and ensuring fair and equitable sharing of benefits arising from genetic resources. Creating a global currency for trading biological resources is not an objective of the convention.

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156. (B) Primary producers
Trophic levels categorize organisms according to energy acquisition pathways in food chains. Primary producers, including autotrophic green plants, algae, and cyanobacteria, occupy the first trophic level. Producers convert solar light energy into stored organic chemical energy through photosynthesis, supplying foundational energy for subsequent consumer levels.

157. (A) The burning of fossil fuels
Combustion of fossil fuels, including coal, oil, and natural gas, directly disrupts the carbon cycle by releasing vast quantities of ancient sequestered carbon into the active atmosphere. Accelerating carbon dioxide emissions overwhelms natural oceanic and terrestrial carbon sinks, enhancing global greenhouse effects and driving global climate change.

18. Which industrial process is responsible for emitting potent synthetic greenhouse gases known as hydrofluorocarbons (HFCs)?
(A) Primary heavy steel manufacturing and smelting processes
(B) Commercial timber logging and primary wood processing
(C) Industrial food and beverage fermentation in breweries
(D) Commercial refrigeration and air conditioning systems

19. What is the fundamental mechanism of the greenhouse effect?
(A) Greenhouse gases allow incoming shortwave solar radiation through but absorb and re-emit outgoing longwave infrared heat
(B) Greenhouse gases absorb all incoming shortwave solar radiation in the upper atmosphere, preventing solar rays from reaching Earth
(C) Greenhouse gases physically trap heat by forming a continuous, solid crystalline thermal barrier throughout the stratosphere
(D) Greenhouse gases chemically convert atmospheric carbon dioxide into elemental oxygen when exposed to elevated temperatures

20. Match List I with List II**:**
List I: (Greenhouse Gas)
P. Carbon dioxide
Q. Methane
R. Nitrous oxide
S. Fluorinated gases
List II: (Primary Anthropogenic Source)
1. Agricultural soil management and fertilisers
2. Fossil fuel combustion
3. Refrigerants and industrial solvents
4. Landfills and enteric fermentation
Which of the following is the correct match?
(A) P-2, Q-4, R-1, S-3
(B) P-1, Q-2, R-3, S-4
(C) P-4, Q-3, R-2, S-1
(D) P-2, Q-1, R-4, S-3

21. Which greenhouse gas is the most abundant in the Earth's atmosphere and plays a crucial role in the natural greenhouse effect, though its levels are not directly controlled by human emissions?
(A) Water vapour
(B) Carbon dioxide
(C) Methane
(D) Ozone

22. What does the term "Global Warming Potential" (GWP) measure?
(A) The exact daily global surface temperature increase caused by a unit emission of an atmospheric gas
(B) The total ambient volume of a greenhouse gas currently remaining active within the global atmosphere
(C) The overall biochemical potential of a gas molecule to degrade and deplete stratospheric ozone layers
(D) Energy absorbed by emitting 1 ton of a gas over time relative to 1 ton of CO_2

23. Which of the following gases has the highest Global Warming Potential (GWP) over a 100-year timescale?
(A) Carbon dioxide molecules (CO_2)
(B) Sulphur hexafluoride (SF_6)
(C) Methane hydrocarbon (CH_4)
(D) Dinitrogen monoxide (N_2O)

24. Tropospheric ozone is considered a greenhouse gas. How is it primarily formed?
(A) Through direct continuous emissions of ozone gas from heavy industrial smokestacks and power plants
(B) Through the structural breakdown of stratospheric ozone filtering down into the lower troposphere
(C) Through photochemical reactions of VOCs and NOx in sunlight
(D) Through natural biological respiration processes occurring among deep-ocean marine organisms

25. Consider the following statements regarding the greenhouse effect:
I. Without the natural greenhouse effect, Earth's average surface temperature would be below freezing.
II. Carbon dioxide is responsible for the majority of the anthropogenic greenhouse effect.
III. Longwave radiation from the Earth's surface passes freely through greenhouse gases into space.
IV. The enhanced greenhouse effect is solely the result of human activities since the Industrial Revolution.
Which of the above statements is/are correct?
(A) I, II, and IV only
(B) I, III, and IV only
(C) II, III, and IV only

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streams causes organic moisture to contaminate recyclable paper and plastic, reducing recovery values and producing foul-smelling mixed waste that disrupts biological composting efficiency, directly explaining the requirement.

169. (D) The primary waste generator
Under the Solid Waste Management Rules, 2016, primary responsibility for source segregation rests with individual waste generators. Households, commercial establishments, and institutions must segregate generated waste into wet, dry, and domestic hazardous streams before handing waste over to authorized municipal collection vehicles.

170. (A) Transforming discarded items into products of higher value.
Upcycling, or creative reuse, is the practice of converting discarded materials, secondary products, or waste items into new materials or products exhibiting higher environmental quality, aesthetic appeal, or economic value, without degrading baseline material quality through industrial downcycling processes.

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(C) Indirect emissions associated with the broader value chain, including third-party transportation and waste
(D) Net greenhouse gas emissions offset externally through certified commercial carbon credit purchase schemes

35. Consider the following statements regarding the measurement of a carbon footprint:
I. A life-cycle assessment (LCA) is often used to measure the carbon footprint of a specific product.
II. Dietary choices, such as high meat consumption, significantly increase an individual's carbon footprint.
III. The calculation of a carbon footprint completely excludes emissions from aviation and public transport.
Which of the above statements is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

36. Which method is most effective for an individual attempting to reduce their personal carbon footprint?
(A) Increasing personal reliance on disposable single-use plastic consumer products
(B) Replacing compact fluorescent lighting with high-wattage incandescent light bulbs
(C) Commuting exclusively using private, non-hybrid internal combustion engine vehicles
(D) Adopting renewable energy providers and upgrading household energy efficiency

37. Which international standard is widely used by organisations to measure and manage their greenhouse gas emissions and carbon footprint?
(A) ISO 9001
(B) ISO 14064
(C) ISO 27001
(D) ISO 45001

38. How is climate change primarily expected to alter forest structures globally?
(A) By driving a rapid global transition of tropical rainforests into temperate deciduous forest ecosystems
(B) By intensifying wildfires and shifting species ranges to higher elevations and latitudes
(C) By altering forest soil chemistry to highly alkaline conditions, suppressing any potential new tree growth
(D) By permanently destroying the upper structural canopy layers across all global forest biome types

39. In Uttar Pradesh, what potential impact might climate change have on the Terai ecosystem's biodiversity?
(A) Drying wetland swamps, threatening endemic species like the swamp deer
(B) Transforming the low-lying plain into a high-altitude cold desert suitable for snow leopards
(C) Substantially decreasing overall soil salinity, preventing the growth of native tall grasses
(D) Exerting zero ecological impact due to the extraordinary natural climate resilience of sal forests

40. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): Climate change poses a severe threat to coral reef biodiversity.
Reason (R): Increased oceanic absorption of carbon dioxide lowers the pH of seawater, making it difficult for corals to build their calcium carbonate skeletons.
In the context of the above statements, which one of the following is correct?
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

41. What is "phenological mismatch" in the context of climate change and biodiversity?
(A) When species rapidly alter their structural morphology and physical appearance in response to ambient thermal stress
(B) When an aggressive invasive alien species colonises a native ecosystem, fully displacing indigenous flora and fauna
(C) When interacting species alter seasonal activity timing at asynchronous rates
(D) When male and female populations of a single migratory species routinely travel to separate continental landmasses

42. Which of the following terms describes the phenomenon where forests, due to extreme stress like severe drought and heat, stop absorbing carbon and begin releasing it?

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(B) It dramatically decreases greenhouse gas concentrations in the troposphere
(C) It blocks incoming ultraviolet radiation, cooling the upper atmosphere
(D) It causes a minor increase in the Earth's average global temperature

10. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): Large volcanic eruptions can cause a short-term cooling effect on the global climate.
Reason (R): Volcanic ash and sulphur aerosols injected into the stratosphere absorb and reflect solar radiation back into space.
In the context of the above statements, which one of the following is correct?
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

11. Which natural phenomenon involves a periodic variation in winds and sea surface temperatures over the tropical eastern Pacific Ocean, significantly affecting global weather?
(A) The Atlantic Meridional Overturning Circulation
(B) The El Nino-Southern Oscillation (ENSO)
(C) The Indian Ocean Dipole
(D) The Pacific Decadal Oscillation

12. Tectonic plate movement is considered a natural cause of long-term climate change because it alters:
(A) The daily rotational speed and axial wobble of the Earth across geological time scales
(B) Continental positions, altering global ocean currents and heat transport
(C) The chemical composition and density of the stratospheric ozone layer globally
(D) The average gravitational distance maintained between the Earth and the Moon

13. Which human activity is universally recognised as the largest contributor to the increase of anthropogenic carbon dioxide in the atmosphere?
(A) Combustion of fossil fuels for energy and transport
(B) Implementation of large-scale organic and regenerative agricultural practices
(C) Global deployment of utility-scale solar panels and onshore wind turbines
(D) Widespread execution of cloud seeding and artificial rainmaking processes

14. How does widespread deforestation directly contribute to man-made climate change?
(A) By altering surface albedo so drastically that it triggers rapid global atmospheric freezing
(B) By destroying wildlife habitats, which directly accelerates atmospheric methane accumulation
(C) By reducing photosynthetic trees, leaving more carbon dioxide in the atmosphere
(D) By disturbing deep soil layers and releasing synthetic fluorinated greenhouse gases

15. Consider the following statements regarding the man-made causes of climate change:
I. Industrial agriculture contributes to climate change primarily through the emission of nitrous oxide from synthetic fertilisers.
II. Cement production is a major industrial source of carbon dioxide emissions.
III. The usage of chlorofluorocarbons (CFCs) cools the lower atmosphere and offsets global warming.
Which of the above statements is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

16. Land-use change is a significant anthropogenic driver of climate change. Which of the following is the best example of this?
(A) Replacing legacy photovoltaic solar panels with higher-efficiency solar module arrays
(B) Transitioning thermal power generation from coal to natural gas electricity grids
(C) Converting natural forest ecosystems into urban concrete infrastructure
(D) Establishing designated marine protected conservation areas in high-seas waters

17. The rearing of livestock, particularly ruminants like cattle and sheep, is a significant man-made cause of climate change primarily due to the emission of which greenhouse gas?
(A) Sulphur hexafluoride
(B) Methane
(C) Ozone
(D) Carbon monoxide

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intense inland soil evaporation
(C) The spontaneous chemical breakdown of gaseous atmospheric nitrogen into solid sodium chloride salt crystals
(D) Excessive accumulation and stagnation of pristine glacial freshwater runoff within deep agricultural soil pores

50. Match List I with List II**:**
List I: (Climate Impact on Agriculture)
P. Heat stress during the flowering stage
Q. Erratic monsoon rainfall
R. Warmer winter temperatures
S. Increased frequency of floods
List II: (Resultant Consequence)
1. Reduced vernalisation, affecting wheat yields
2. Waterlogging and soil erosion
3. Delayed sowing and crop failure
4. Grain abortion and reduced seed setting
Which of the following is the correct match?
(A) P-4, Q-3, R-1, S-2
(B) P-1, Q-2, R-4, S-3
(C) P-3, Q-4, R-2, S-1
(D) P-4, Q-1, R-3, S-2

51. Which two factors are the primary scientific causes of global sea-level rise resulting from climate change?
(A) Rapid melting of floating polar sea ice sheets and increased annual precipitation directly over open ocean basins
(B) Thermal expansion of ocean water combined with the melting of land-based ice sheets and glaciers
(C) Large-scale subsea tectonic plate movements accompanied by widespread global bleaching of shallow coral reefs
(D) Major increases in global riverine freshwater discharge and accelerated tectonic expansion of the oceanic crust

52. Which coastal ecosystem acts as a crucial natural barrier against sea-level rise and storm surges, but is highly vulnerable to rapid inundation?
(A) Mangrove forests
(B) Coniferous forests
(C) Alpine meadows
(D) Savannah grasslands

53. How does a rise in sea level threaten coastal freshwater resources?
(A) By altering hydraulic pressure gradients, causing inland freshwater aquifers to rapidly empty into open ocean basins
(B) Through saltwater intrusion into coastal aquifers, rendering groundwater unsafe for drinking and irrigation
(C) By accelerating atmospheric heat transfer and dramatically elevating surface evaporation rates of inland lakes
(D) By triggering localized microclimate cooling that converts coastal freshwater bodies into solid permanent glaciers

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54. The displacement of human populations due to the permanent inundation of low-lying coastal areas gives rise to which specific socioeconomic issue?
(A) Rapid industrialisation of submerged lands
(B) The immediate elimination of global poverty
(C) The emergence of climate refugees
(D) An absolute increase in global food security

55. Consider the following statements regarding the impact of sea-level rise on coastal areas:
I. Accelerated coastal erosion is a direct consequence of rising sea levels.
II. Higher sea levels decrease the destructive potential of cyclonic storm surges.
III. Low-lying island nations, such as the Maldives, face an existential threat from sea-level rise.
IV. Estuarine ecosystems may suffer due to changes in salinity gradients.
Which of the above statements is/are correct?
(A) I, II, and III only
(B) I, III, and IV only
(C) II, III, and IV only
(D) I, II, III, and IV

56. Which term describes the process where coastal habitats, like wetlands, migrate inland in response to rising sea levels, provided there are no physical barriers?
(A) Coastal squeeze
(B) Transgression
(C) Accretion
(D) Subsidence

57. The long-term impact of melting Himalayan glaciers on the rivers of Northern India (such as the Ganga and Yamuna) is expected to follow which sequence?
(A) An immediate and permanent complete desiccation of all major river channels across Northern India within a single year
(B) Initial increased river flow and flooding, followed by reduced dry-season flow as

(D) I, II, III, and IV

26. Which of the following is considered a primary indicator of global warming?
(A) An increase in the occurrence and duration of total lunar eclipses
(B) The continuous reduction in Arctic sea ice extent
(C) The observed cooling trend throughout the lower stratospheric layers
(D) The progressive rise in overall salinity levels of freshwater lakes

27. What is the phenomenon where increased global temperatures cause ocean waters to expand, contributing to sea-level rise?
(A) Ocean acidification
(B) Thermal expansion
(C) Eutrophication
(D) Salinity contraction

28. Which of the following biological events serves as an indicator of global warming in many ecosystems?
(A) An increase in the physical thickness and density of winter fur coats in terrestrial mammals
(B) The steady geographical migration of endemic tropical species directly towards the equator
(C) The widespread slowing down of baseline metabolic rates in amphibians on a global scale
(D) Earlier spring onset, including flower blooming and bird migration

29. Global warming is leading to an increase in the number of "cooling degree days." What does this metric indicate?
(A) The total annual number of days when ambient outdoor temperatures drop below freezing
(B) The overall electrical energy demand required to heat residential buildings during winter
(C) Energy demand needed to cool buildings during warmer outdoor weather
(D) The total cumulative number of days alpine glaciers undergo physical melting in a year

30. How does global warming affect the Earth's permafrost regions?
(A) It deepens the active layer, thawing permafrost and releasing trapped greenhouse gases
(B) It causes permafrost zones to expand towards equatorial regions, substantially increasing global albedo
(C) It permanently solidifies underlying frozen soil layers, completely halting organic decomposition
(D) It replaces subarctic permafrost ecosystems with dense tropical rainforests within a few years

31. Which change in precipitation patterns is strongly recognised as an indicator of global warming?
(A) A steady and universal decline in total annual rainfall amounts across all continental landmasses
(B) Higher frequency and intensity of extreme heavy precipitation events
(C) An exactly uniform distribution of rainfall measured throughout the entire calendar year globally
(D) The absolute and permanent cessation of seasonal snowfall across all high-altitude mountain ranges

32. What is the standard definition of a "carbon footprint"?
(A) The total cumulative mass of non-biodegradable municipal solid waste produced by an individual annually
(B) The permanent physical land disturbance left on soil surfaces by industrial carbon extraction machinery
(C) The net quantity of atmospheric carbon successfully sequestered by an individual through tree planting
(D) The total greenhouse gases emitted directly or indirectly by human activities

33. A carbon footprint is generally expressed in equivalent tons of which gas?
(A) Molecular oxygen (O_2 eq)
(B) Carbon dioxide (CO_2 eq)
(C) Atmospheric methane (CH_4 eq)
(D) Nitrous oxide gas (N_2O eq)

34. In greenhouse gas accounting for a corporation, what do "Scope 1" emissions represent?
(A) Indirect greenhouse gas emissions generated off-site from purchased electricity, steam, heating, and cooling
(B) Direct emissions from owned or controlled operational facilities and vehicles

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158. (C) IUCN
The Red Data Book is compiled and published globally by the International Union for Conservation of Nature. First established in 1964, the Red List provides comprehensive scientific assessments evaluating global conservation statuses and extinction threats faced by thousands of plant, animal, and fungal species worldwide.

159. (D) Polythene bag
Biodegradability distinguishes organic materials from synthetic items. Banana peels, fallen leaves, and leftover food comprise natural organic matter that decomposer microorganisms rapidly break down into compost. In contrast, polythene bags are non-biodegradable synthetic petroleum polymers that resist microbial digestion, persisting in natural environments for centuries.

160. (A) P-3, Q-2, R-4, S-1
Appropriate waste disposal depends on material composition. Kitchen wet waste is processed via biological composting, used heavy-metal batteries require specialized hazardous waste treatment, infectious surgical cotton mandates thermal incineration under bio-medical rules, and discarded newspapers are collected for reprocessing into recycled paper products.

161. (B) National Park
Under the Wildlife (Protection) Act, 1972, National Parks provide the highest degree of legal protection among designated protected areas. Unlike Wildlife Sanctuaries, human activities including forestry operations, livestock grazing, and private land rights are strictly prohibited inside National Parks to safeguard pristine habitats and wildlife.

162. (D) CFC-11
Ozone Depletion Potential measures the relative impact of chemical compounds in degrading stratospheric ozone compared to a benchmark reference substance. Trichlorofluoromethane, designated as CFC-11, serves as the international baseline standard assigned an ODP value of 1.0, against which all other halogenated compounds are scientifically evaluated.

163. (A) Prevent toxic chemicals from harming aquatic life and bioaccumulating.
Treating industrial effluents prior to river discharge removes heavy metals, toxic organic solvents, and acid compounds. Effective treatment prevents toxic chemical accumulation in aquatic food webs, protects fish populations, preserves dissolved oxygen levels, and safeguards downstream municipal drinking water supplies from chemical contamination.

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164. (B) I, III, and IV only
Sustainable waste management strategies focus on designing durable goods, establishing biomethanation plants for wet waste, and enforcing Extended Producer Responsibility. Promoting single-use disposables generates non-biodegradable waste, contradicting sustainable resource management principles, confirming the remaining strategic choices as effective.

165. (A) Severe worker health hazards and release of toxic fumes.
Informal processing of electronic waste using backyard burning and acid leaching creates severe health and environmental hazards. Thermal burning releases toxic dioxins, furans, lead dust, and heavy metal vapors, causing severe respiratory damage in workers, contaminating topsoil, and polluting local groundwater resources.

166. (D) Microplastic
Microplastics are synthetic solid plastic particles measuring less than 5 millimeters in length. Originating from fragmented macroplastics or primary microbeads, microplastics persist in aquatic environments, absorb persistent organic pollutants, and enter marine food webs when ingested by zooplankton, fish, and filter-feeding organisms.

167. (B) Eliminate waste, keep materials in use, and regenerate nature.
A circular economy replaces linear take-make-waste economic models with restorative systems designed to eliminate waste and pollution. By keeping products and materials in high-value usage through repair, reuse, remanufacturing, and recycling, circular economic models decouple economic activity from finite resource consumption and regenerate natural ecosystems.

168. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Source segregation of municipal waste into wet organic and dry recyclable streams is essential for successful waste management. Mixing waste

(A) Industrial atmospheric carbon sequestration and storage processes
(B) Natural microbial bioremediation and soil phytoremediation techniques
(C) Regional afforestation surplus and ecological biomass accumulation
(D) Forest dieback, converting forest sinks into net carbon sources

43. How does climate change facilitate the spread of invasive species in native forest ecosystems?
(A) Heat stress causes native forest plant species to become genetically identical to introduced invasive species
(B) Warming and altered rainfall create conditions favoring fast colonizing, adaptable species
(C) Topographical changes from climate stress construct physical land barriers trapping invasive species in forests
(D) Elevated atmospheric carbon dioxide concentrations cause all invasive weed species to instantly perish on contact

44. The decline in the population of amphibians globally is highly sensitive to climate change. What is the primary environmental reason for this?
(A) Permeable skin makes them highly sensitive to temperature and moisture changes
(B) They depend exclusively on consuming shallow-water coral reef organisms that are dying from marine heatwaves
(C) Rising ambient temperatures cause them to completely cease sexual reproduction and shift to obligate asexuality
(D) They undertake multi-continental migrations across Arctic tundra regions that are currently blocked by sea ice thaw

45. What is a projected negative impact of climate change on agricultural productivity in India?
(A) A uniform increase in overall wheat crop productivity recorded across all northern agricultural states
(B) Reduced crop yields resulting from severe heat stress and erratic monsoon rainfall patterns
(C) Complete elimination of all agricultural pest populations resulting directly from elevated air temperatures
(D) Significant extension of the cool growing season for traditional Rabi crops well into hot summer months

46. What effect does elevated atmospheric carbon dioxide initially have on C3 crops like wheat and rice, assuming other factors like water and nutrients are abundant?
(A) It drastically reduces their overall photosynthetic efficiency and stomatal conductance within hours
(B) It releases toxic carbonic compounds that immediately poison root systems and kill growing crops
(C) It induces severe metabolic disruption that causes agricultural crops to stop producing seeds entirely
(D) It triggers the carbon fertilisation effect, initially enhancing photosynthetic rate and biomass

47. In the context of Uttar Pradesh, how is climate change expected to alter traditional crop patterns?
(A) Shifting from water-intensive sugarcane and paddy to drought-resistant millets
(B) Shifting agricultural production exclusively to cold-climate fruits like temperate apples and cherries
(C) Shifting the traditional sowing timeline of heat-tolerant Kharif crops directly into peak winter months
(D) Relocating commercial sugarcane cultivation entirely from Western UP into arid Bundelkhand districts

48. How do rising nighttime temperatures due to climate change affect crop productivity?
(A) They significantly increase the severity and frequency of localized frost damage on tender young plant shoots
(B) They completely inhibit daytime photosynthetic light reactions by damaging chlorophyll structures in foliage
(C) They create thermal soil conditions that permanently prevent the biological germination of viable crop seeds
(D) They accelerate nighttime dark respiration, consuming carbohydrates and lowering crop yields

49. Climate change is expected to exacerbate the problem of soil salinity in agricultural lands primarily through:
(A) Significantly reduced soil evaporation rates combined with enhanced precipitation in arid agricultural zones
(B) Coastal seawater intrusion combined with

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CHAPTER 05
Climate Change and Climate Protection

1. Which of the following best defines climate change in the scientific context?
(A) Sudden daily fluctuations in atmospheric pressure and wind speed
(B) Long-term alterations in global or regional temperature and typical weather patterns
(C) The natural seasonal shift from summer to winter over a geographical region
(D) Short-term variations in precipitation and humidity over a single decade

2. According to the World Meteorological Organization (WMO), what is the standard classical period used to evaluate average climate norms?
(A) 10 years
(B) 20 years
(C) 30 years
(D) 50 years

3. Which of the following is a primary distinction between weather and climate?
(A) Weather describes atmospheric conditions over a short period, whereas climate is how the atmosphere behaves over relatively long periods
(B) Weather refers to global patterns, whereas climate is specific to local regions
(C) Weather only measures precipitation, whereas climate measures temperature
(D) Weather cannot be predicted, whereas climate is entirely predictable daily

4. Which field of study specifically involves reconstructing past climates using proxy data such as ice cores and tree rings?
(A) Meteorology
(B) Climatology
(C) Paleoclimatology
(D) Geomorphology

5. Why is the concept of a "baseline period" important in defining climate change?
(A) It provides a historical baseline to evaluate long-term climate trends
(B) It provides a short-term forecast to manage immediate disaster response
(C) It provides an exact calendar year when global climate change began
(D) It provides a geographic restriction of data to equatorial regions

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6. Which of the following indicates an alteration in climate rather than a natural weather anomaly?
(A) A single unusually severe tropical cyclone occurring in the North Atlantic basin
(B) A colder than average winter season recorded across North India in a specific year
(C) Heavy monsoon rainfall recorded continuously over a period of two consecutive years
(D) A persistent upward trend in global mean surface temperatures over fifty years

7. How does volcanic activity naturally influence the Earth's climate?
(A) It releases massive quantities of oxygen gas, which rapidly cools the global lower atmosphere
(B) It emits stratospheric sulphur dioxide aerosols that reflect solar radiation and cool the planet
(C) It permanently depletes stratospheric ozone layer, leading to immediate and severe global warming
(D) It alters the Earth's orbital eccentricity and axial precession, changing global seasonal dynamics

8. Which term describes the natural variations in Earth's orbit, axial tilt, and precession that affect the distribution of solar radiation received by Earth?
(A) Keeling cycles
(B) Hadley cells
(C) Milankovitch cycles
(D) Coriolis parameters

9. During periods of maximum sunspot activity, the solar constant slightly increases. What natural effect does this have on Earth's climate?
(A) It triggers instant global ice ages

glaciers shrink
(C) An absolutely constant, perfectly regulated flow of water maintained across all seasons irrespective of rainfall patterns
(D) A permanent tectonic reorientation that causes major Himalayan rivers to reverse their flow back towards Tibet

58. Glacial Lake Outburst Floods (GLOFs) are becoming a critical hazard due to climate change. What causes a GLOF?
(A) The rapid flash-freezing of river water expanding and causing artificial concrete dam structures to burst open
(B) Failure of a moraine dam holding a glacial lake, releasing massive downstream water flow
(C) Prolonged heavy monsoon rainstorms falling over low-lying coastal plains during astronomical high tide events
(D) Sudden tectonic uplift occurring directly beneath a dried-up ancient riverbed in stable continental shields

59. Which concept explains how the loss of highly reflective glacial ice contributes to further global warming?
(A) The rotational Coriolis effect mechanism
(B) The ice-albedo positive feedback loop
(C) The carbon fertilisation feedback mechanism
(D) The stratospheric cooling thermal effect

60. Select the correct logical sequence of the long-term impact of melting glaciers on water security:
(A) Decreased glacial mass → Reduced meltwater during summers → Water scarcity for agriculture → Lower crop yields
(B) Lower crop yields → Decreased glacial mass → Water scarcity for agriculture → Reduced meltwater during summers
(C) Water scarcity for agriculture → Reduced meltwater during summers → Lower crop yields → Decreased glacial mass
(D) Reduced meltwater during summers → Lower crop yields → Decreased glacial mass → Water scarcity for agriculture

61. How does the melting of glaciers impact hydroelectric power generation in mountain regions in the long run?
(A) It permanently guarantees an infinite, highly predictable volume of water required for continuous turbine operation
(B) It jeopardises power generation due to erratic flows and lower long-term baseflow
(C) It substantially increases thermodynamic turbine efficiency by delivering significantly colder meltwater into reservoirs
(D) It exerts zero operational impact because high-altitude hydroelectric facilities operate independently of river discharge

62. Which vital natural function do mountain glaciers provide for the hydrological cycle during dry seasons?
(A) Natural reservoirs slowly releasing meltwater during low rainfall periods
(B) They completely halt the global hydrological cycle by indefinitely trapping all ambient atmospheric moisture
(C) They actively generate significant volumes of carbon dioxide gas, thereby elevating regional atmospheric humidity
(D) They construct massive natural ice barriers that physically block all mountain rivers from ever reaching the ocean

63. What is the full form of the IPCC, the United Nations body responsible for assessing the science related to climate change?
(A) International Panel on Climate Control
(B) Intergovernmental Panel on Climate Change
(C) International Programme for Climate Conservation
(D) Intercontinental Protocol on Climate Change

64. Which two organisations jointly established the IPCC in 1988?
(A) The International Bank for Reconstruction and Development (World Bank) and the International Monetary Fund (IMF)
(B) World Meteorological Organization (WMO) and United Nations Environment Programme (UNEP)
(C) The World Health Organization (WHO) and the United Nations Development Programme (UNDP)
(D) The Food and Agriculture Organization (FAO) and the Global Environment Facility (GEF)

65. Consider the following statements about the functioning of the IPCC:
I. The IPCC conducts its own original field research and climate modeling.
II. The IPCC assesses published scientific literature to provide comprehensive summary reports.

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119. What term is used to describe the carbon stored specifically in coastal and marine ecosystems, such as mangroves and salt marshes?
(A) Green carbon
(B) Blue carbon
(C) Brown carbon
(D) Black carbon

120. Consider the following ecosystems:
I. Tropical Peat Swamp Forests
II. Open Grasslands
III. Desert Scrub
Which of the following represents the correct descending order of their typical carbon sequestration capacity per hectare (highest to lowest)?
(A) I, II, III
(B) III, II, I
(C) II, I, III
(D) I, III, II

121. How does deforestation convert a forest from a "carbon sink" into a "carbon source"?
(A) Felled trees undergo biochemical transformations that cause cut timber to actively synthesize and emit methane gas
(B) Stored carbon in biomass and soil is released via burning or decay
(C) Cleared land absorbs intense solar thermal radiation, which spontaneously synthesizes ambient carbon dioxide
(D) Removing tree cover triggers soil chemical imbalances that force surrounding topsoil to absorb carbon at toxic rates

122. Under the mechanism known as REDD+, what are developing countries financially incentivised to do?
(A) Clear primary natural forests rapidly to accommodate industrial agricultural expansion projects
(B) Curb deforestation and degradation while promoting forest conservation and sustainability
(C) Permanently relocate indigenous forest-dwelling communities into densely populated urban centres
(D) Convert natural broadleaf forest ecosystems exclusively into commercial monoculture timber plantations

123. Which forestry practice significantly enhances the carbon sequestration capacity of degraded lands?
(A) Industrial clear-cutting techniques
(B) Slash-and-burn agriculture
(C) Afforestation and Reforestation
(D) Uncontrolled cattle overgrazing

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124. In climate change terminology, what is the fundamental difference between "mitigation" and "adaptation"?
(A) Mitigation reduces greenhouse gas emissions, while adaptation adjusts to climate impacts
(B) Mitigation operates exclusively on a local scale, whereas adaptation strategies are inherently implemented on a global scale
(C) Mitigation focuses strictly on adjusting to heatwave impacts, whereas adaptation focuses exclusively on planting trees
(D) There is no scientific difference between these concepts; both are completely interchangeable terminology

125. Consider the following strategies:
I. Building higher sea walls to prevent coastal flooding.
II. Developing drought-resistant crop varieties.
III. Installing solar farms to replace coal power plants.
Which of the above are examples of climate change adaptation?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

126. Which of the following is a classic example of climate change mitigation?
(A) Relocating vulnerable human settlements away from low-lying, flood-prone riverbanks and coastal zones
(B) Upgrading municipal storm drainage infrastructure networks to handle extreme localized rainfall events
(C) Electrifying public transport fleets to lower vehicle emissions
(D) Establishing regional early warning communication systems and emergency evacuation protocols for cyclones

127. Why is a combination of both adaptation and mitigation considered essential?
(A) Mitigation strategies require massive financial capital, whereas local adaptation measures are completely cost-free
(B) Historical emissions make warming unavoidable, requiring concurrent adaptation

75. The Paris Agreement (2015) aims to hold the increase in the global average temperature to well below what threshold above pre-industrial levels?
(A) 1.0°C
(B) 2.0°C
(C) 3.5°C
(D) 5.0°C

76. In addition to the "well below" target, the Paris Agreement states that nations should pursue efforts to limit the temperature increase to what optimal level to significantly reduce the risks and impacts of climate change?
(A) 0.5°C
(B) 1.5°C
(C) 2.5°C
(D) 3.0°C

77. The Paris Agreement is legally binding, but its core mechanism relies on individual countries setting their own climate targets. What are these targets called?
(A) Legally Binding Emission Reduction Quotas (BEQs)
(B) Nationally Determined Contributions (NDCs)
(C) Sovereign Climate and Emissions Limits (SCLs)
(D) Mandated Global Standard Climate Pledges (GSPs)

78. What is the "Global Stocktake" mechanism under the Paris Agreement?
(A) An annual independent financial audit of the Green Climate Fund to track international aid distribution
(B) A 5-year assessment of collective progress toward Paris Agreement goals
(C) A centralized international registry tracking all afforestation and reforestation projects planted globally
(D) A mandatory punitive enforcement mechanism used to issue financial sanctions on non-compliant nations

79. Under the Paris Agreement framework, what does the term "ratchet mechanism" signify?
(A) The automatic adjustment and lowering of national climate targets during periods of economic recession
(B) The rule that successive NDCs must show progression and higher ambition
(C) The technological process involving physical locking and long-term stabilization of carbon in agricultural soils
(D) The international legal mechanism designed to permanently expel non-compliant sovereign states from the UNFCCC

80. Match List I with List II:
List I: (Climate Agreements/Events)
P. UNFCCC (1992)
Q. Kyoto Protocol (1997)
R. Paris Agreement (2015)
S. COP 27 (2022)
List II: (Key Feature)
1. Introduced legally binding emission reduction targets for developed countries
2. Established the Loss and Damage Fund
3. The foundational treaty to stabilise greenhouse gas concentrations
4. Introduced the framework of Nationally Determined Contributions (NDCs)

Which of the following is the correct match?
(A) P-3, Q-1, R-4, S-2
(B) P-1, Q-3, R-2, S-4
(C) P-3, Q-4, R-1, S-2
(D) P-4, Q-2, R-3, S-1

81. How does the Paris Agreement differ fundamentally from the Kyoto Protocol regarding participation?
(A) The Paris Agreement applies binding emission reductions exclusively to developed nations, whereas Kyoto applied to all countries globally
(B) Paris requires all nations to submit pledges, while Kyoto targeted only developed countries
(C) The Paris Agreement completely eliminates all requirements for member states to monitor and report domestic greenhouse gas emissions
(D) The Paris Agreement focuses exclusively on climate adaptation measures, whereas the Kyoto Protocol focused entirely on emission mitigation

82. The Kyoto Protocol was adopted in 1997 but entered into force in which year, after Russia ratified it?
(A) 1999
(B) 2001
(C) 2005
(D) 2012

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Which traditional water harvesting structures are prioritised for rejuvenation in the state?
(A) High-altitude mountain glacial moraine structures
(B) Stepwells (Baolis) and village ponds (Talabs)
(C) Large-scale coastal seawater desalination plants
(D) Deep industrial groundwater injection well systems

136. Which initiative in Uttar Pradesh aims to support climate mitigation by providing energy-efficient agricultural pumps to farmers?
(A) PM-KUSUM Scheme
(B) PM-KISAN (Pradhan Mantri Kisan Samman Nidhi Scheme)
(C) PM-SYM (Pradhan Mantri Shram Yogi Maandhan Scheme)
(D) PM-FBY (Pradhan Mantri Fasal Bima Yojana Scheme)

137. How does the UP government's push for ethanol blending in petrol, primarily sourced from sugarcane molasses, contribute to climate protection?
(A) It significantly increases total tailpipe particulate matter and vehicle carbon footprint
(B) It replaces fossil fuels with renewable biofuel, lowering greenhouse emissions
(C) It completely halts and prevents the tailpipe emission of all exhaust gases from engines
(D) It directly replaces conventional internal combustion engines with electric battery motors

138. What is the Green Climate Fund (GCF)?
(A) An international private commercial banking consortium created to fund deep-sea oil exploration projects
(B) A UNFCCC financial mechanism supporting developing nations in adaptation and mitigation
(C) A compulsory international environmental tax collected directly from all tax-paying citizens of developed states
(D) A non-governmental environmental research organization headquartered and operating exclusively in New Delhi, India

139. In which year was the Green Climate Fund formally established during the COP 16 in Cancun?
(A) 1997
(B) 2005
(C) 2010
(D) 2015

140. Match List I with List II**:**
List I: (Climate Finance Term)
P. Green Climate Fund (GCF)
Q. Global Environment Facility (GEF)
R. Adaptation Fund
S. Loss and Damage Fund
List II: (Description)
1. Established to finance concrete adaptation projects in developing countries under the Kyoto Protocol
2. Agreed upon at COP 27 to assist vulnerable nations facing severe climate impacts
3. Operating entity of the UNFCCC financial mechanism based in Incheon, South Korea
4. An independently operating financial organisation serving as financial mechanism for several environmental conventions

Which of the following is the correct match?
(A) P-3, Q-4, R-1, S-2
(B) P-1, Q-2, R-3, S-4
(C) P-4, Q-3, R-2, S-1
(D) P-3, Q-1, R-4, S-2

141. Where is the headquarters (Secretariat) of the Green Climate Fund located?
(A) Geneva, Republic of Switzerland
(B) New York, USA
(C) Incheon, South Korea
(D) Nairobi, Kenya

142. The Green Climate Fund aims for a balanced allocation of its resources. What is the targeted balance?
(A) 90% for mitigation and 10% for adaptation
(B) A 50:50 balance between mitigation and adaptation over time
(C) 100% focused exclusively on building solar farms
(D) 70% for administrative costs and 30% for project implementation

143. Which of the following best describes the principle of "country ownership" as applied by the Green Climate Fund?
(A) The GCF retains full legal land title and real estate ownership for all funded infrastructure projects
(B) Developing nations define their climate priorities and guide fund allocation
(C) Developed donor nations legally retain

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93. What is the primary objective of the National Mission for a Green India (Green India Mission) under the NAPCC?
(A) To paint all urban residential and commercial buildings green to mitigate the localized urban heat island effect across cities
(B) To protect, restore, and enhance India's forest cover through adaptation and mitigation
(C) To strictly mandate and promote the commercial adoption of green hydrogen fuel cells across the domestic transport sector
(D) To enforce an unconditional legal ban prohibiting the cutting of any tree species across all national states and territories

94. The National Mission on Sustainable Agriculture (NMSA) under NAPCC promotes which of the following practices to enhance agricultural resilience?
(A) Heavy reliance on synthetic chemical fertilisers
(B) Promotion of monoculture farming across all agro-climatic zones
(C) Micro-irrigation, organic farming, and soil health management
(D) Extensive use of deep tube wells for unregulated groundwater extraction

95. Consider the following missions:
I. National Mission for Sustaining the Himalayan Ecosystem
II. National Mission on Strategic Knowledge for Climate Change
III. National Mission for Clean Ganga
Which of the above are official core missions under the NAPCC?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

96. Under the NAPCC, the National Water Mission aims to increase water use efficiency by what percentage?
(A) 10%
(B) 20%
(C) 35%
(D) 50%

97. In the context of the UNFCCC, what does NDC stand for?
(A) National Domestic Climate Commitments
(B) Nationally Determined Contributions
(C) Non-Disclosed Carbon Emissions Quotas
(D) Natural Depletion of Atmospheric Carbon

98. In August 2022, India updated its NDCs. What is India's revised target for reducing the emissions intensity of its GDP by 2030, compared to 2005 levels?
(A) 33 to 35 percent
(B) 45 percent
(C) 50 percent
(D) 65 percent

99. According to India's updated NDCs, what percentage of cumulative electric power installed capacity is to be achieved from non-fossil fuel-based energy resources by 2030?
(A) 30 percent
(B) 40 percent
(C) 50 percent
(D) 60 percent

100. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): India's Nationally Determined Contributions heavily emphasise a transition to renewable energy sources.
Reason (R): India aims to reduce its reliance on fossil fuels to decrease the emissions intensity of its economy while meeting growing energy demands.
In the context of the above statements, which one of the following is correct?
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

101. Which specific lifestyle initiative was incorporated into India's updated NDC document as a mass movement for environmental protection?
(A) Swachh Bharat Abhiyan Cleanliness Campaign
(B) LIFE (Lifestyle for Environment)
(C) Make in India Manufacturing Initiative
(D) Atmanirbhar Bharat Self-Reliance Drive

102. India's original NDC (submitted in 2015) included a target to create an additional carbon sink through additional forest and tree cover by 2030. What was the quantum of this carbon sink target?
(A) 1 to 1.5 billion tonnes of CO_2 equivalent

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III. IPCC assessment reports are strictly policy-prescriptive, dictating laws to sovereign nations.

Which of the above statements is/are correct?
(A) I and II only
(B) II only
(C) I and III only
(D) II and III only

66. The IPCC is divided into three Working Groups. What is the primary focus of Working Group I (WG I)?
(A) Assessment of Impacts, Adaptation, and Socioeconomic Vulnerability
(B) Global Mitigation Strategies and Greenhouse Gas Reduction Mechanisms
(C) The Physical Science Basis of climate change
(D) Standardization of National Greenhouse Gas Inventory Methodologies

67. The IPCC regularly publishes comprehensive reports known as ARs. What does AR stand for?
(A) Annual Review
(B) Assessment Report
(C) Action Requirement
(D) Analytical Research

68. Which prestigious international award was jointly awarded to the IPCC and Al Gore in 2007 for their efforts in building up and disseminating knowledge about man-made climate change?
(A) The Kyoto Prize
(B) The Nobel Peace Prize
(C) The Tyler Prize for Environmental Achievement
(D) The Right Livelihood Award

69. What is the primary objective of the United Nations Framework Convention on Climate Change (UNFCCC) adopted in 1992?
(A) To enforce a complete international legal ban on fossil fuel extraction and combustion across all member states by 2000
(B) Stabilizing greenhouse gas concentrations to prevent dangerous human interference with climate
(C) To mandate the immediate global implementation of a standardized, legally binding carbon tax on all sovereign nations
(D) To promote, subsidise, and accelerate the rapid construction of civilian nuclear energy facilities in developing countries

70. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).

Assertion (A): The UNFCCC operates on the principle of "Common but Differentiated Responsibilities and Respective Capabilities" (CBDR-RC).

Reason (R): It acknowledges that while all countries must fight climate change, developed countries have historically contributed more to greenhouse gas emissions and should bear a greater burden.

In the context of the above statements, which one of the following is correct?
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

71. In the context of the UNFCCC, what does the acronym 'COP' stand for?
(A) International Committee on Protocols
(B) Conference of the Parties
(C) Global Council of Politicians
(D) Scientific Consortium on Pollution

72. Where was the historic COP 21 held, which resulted in the adoption of the Paris Agreement?
(A) Kyoto
(B) Copenhagen
(C) Paris
(D) Glasgow

73. At the COP 26 summit in Glasgow (2021), India announced its 'Panchamrit' strategy. Which of the following was the defining target of this strategy regarding Net Zero emissions?
(A) Achieving Net Zero by 2030
(B) Achieving Net Zero by 2050
(C) Achieving Net Zero by 2070
(D) Achieving Net Zero by 2100

74. Which COP conference is widely known for establishing the operational rulebook for the Paris Agreement, often referred to as the Katowice Climate Package?
(A) COP 15
(B) COP 21
(C) COP 24
(D) COP 27

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3. A permit given or sold to an entity allowing a specific amount of emissions
4. The historical or projected level of emissions used as a reference point

Which of the following is the correct match?
(A) P-3, Q-2, R-1, S-4
(B) P-1, Q-3, R-4, S-2
(C) P-2, Q-4, R-1, S-3
(D) P-3, Q-1, R-2, S-4

111. Which renewable energy source relies on the kinetic energy of air currents to generate electricity without emitting greenhouse gases?
(A) Geothermal energy
(B) Biomass energy
(C) Wind energy
(D) Tidal energy

112. How does the expansion of renewable energy directly contribute to climate protection?
(A) By directly capturing and absorbing elevated levels of existing carbon dioxide gas from the lower atmosphere
(B) By replacing fossil fuel power, substantially reducing greenhouse gas emissions
(C) By cooling surrounding local atmospheric layers through widespread physical canopy shading effects
(D) By significantly increasing global planetary albedo through widespread installation of dark solar panels

113. India established the International Solar Alliance (ISA) jointly with which country during COP 21?
(A) Germany
(B) United Kingdom
(C) France
(D) Japan

114. What is the primary limitation of solar and wind energy that necessitates the development of advanced energy storage systems (like batteries) for effective climate protection?
(A) They generate hazardous levels of high-level radioactive nuclear waste during daily operational cycles
(B) Intermittency, as power generation depends on solar and wind availability
(C) They discharge large quantities of toxic sulphur dioxide and nitrogen oxide pollutants into the air during operation
(D) They demand vast, unsustainable volumes of purified freshwater resources to continuously operate generation turbines

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115. Consider the following statements regarding renewable energy expansion in India:
I. India has targeted 500 GW of non-fossil fuel capacity by 2030.
II. Solar power constitutes the largest share of India's current renewable energy capacity.
III. Green hydrogen is produced using electricity generated from renewable sources.
IV. Nuclear energy is officially classified as a renewable energy source by the Indian government.

Which of the above statements is/are correct?
(A) I, II, and III only
(B) I, III, and IV only
(C) II, III, and IV only
(D) I, II, and IV only

116. Which of the following is considered a "carbon-neutral" renewable energy source, assuming the rate of consumption equals the rate of regeneration?
(A) Coalbed methane
(B) Biomass
(C) Shale gas
(D) Petroleum coke

117. What is "carbon sequestration" in the context of forests?
(A) Controlled burning of timber to rapidly release stored carbon back into the surrounding atmosphere
(B) Trees capturing atmospheric CO_2 and storing it in biomass and soil
(C) Application of synthetic chemical nitrogen fertilisers to forest soils to accelerate vegetation growth
(D) Technological injection of high-pressure liquid carbon dioxide directly into dead tree trunks

118. Which component of a forest ecosystem typically stores the largest amount of carbon globally?
(A) Living foliage within the primary upper canopy layers
(B) Forest soils including organic litter and roots
(C) Deadwood and decaying fallen branches on the surface
(D) The lower herbaceous undergrowth and shrub layer vegetation

83. The Kyoto Protocol placed a heavier burden on developed nations under the principle of CBDR. The countries with legally binding emission reduction targets were listed in which annex of the UNFCCC?
(A) Annex I
(B) Non-Annex I
(C) Annex B
(D) Annex C

84. Which of the following was NOT one of the flexible market mechanisms introduced by the Kyoto Protocol to help countries meet their emission targets?
(A) Clean Development Mechanism (CDM)
(B) Joint Implementation (JI)
(C) Emissions Trading
(D) The Green Climate Fund Guarantee

85. Consider the following statements regarding the limitations of the Kyoto Protocol:
I. The United States, a major emitter, signed but never ratified the treaty.
II. Developing nations with large and rapidly growing emissions, like China and India, were exempt from binding targets.
III. The protocol succeeded in halting global carbon emissions entirely during its first commitment period.
IV. It faced challenges due to the withdrawal of Canada before the end of the first commitment period.
Which of the above statements is/are correct?
(A) I, II, and IV only
(B) I, II, and III only
(C) II, III, and IV only
(D) I, III, and IV only

86. Under the Kyoto Protocol's Clean Development Mechanism (CDM), an emission-reduction project in a developing country can earn certified emission reduction (CER) credits. What is the equivalent of one CER?
(A) One tonne of methane
(B) One tonne of carbon dioxide
(C) Ten tonnes of carbon dioxide
(D) One kilogram of chlorofluorocarbons

87. What was the duration of the first commitment period of the Kyoto Protocol?
(A) 1997 to 2005
(B) 2000 to 2010
(C) 2008 to 2012
(D) 2013 to 2020

88. The Doha Amendment to the Kyoto Protocol, adopted in 2012, was established to:
(A) Completely scrap the Kyoto Protocol framework immediately and fast-track the implementation of the Paris Agreement
(B) Establish the second commitment period of the Kyoto Protocol from 2013 to 2020
(C) Mandate the inclusion of international commercial aviation and maritime shipping sectors within binding emission targets
(D) Force rapidly emerging developing nations to accept legally binding emission reduction targets retroactively from 1997

89. In which year was India's National Action Plan on Climate Change (NAPCC) formally launched?
(A) 2005
(B) 2008
(C) 2014
(D) 2016

90. Consider the following climate-related developments:
I. Adoption of the Paris Agreement
II. Launch of India's NAPCC
III. Adoption of the Kyoto Protocol
IV. Establishment of the IPCC
Which of the following is the correct chronological sequence of these developments?
(A) IV, III, II, I
(B) III, IV, I, II
(C) IV, II, III, I
(D) II, IV, III, I

91. The NAPCC encompasses how many core national missions to tackle climate change?
(A) 5
(B) 6
(C) 8
(D) 10

92. Which mission under the NAPCC specifically focuses on promoting energy efficiency in the industrial sector through the Perform, Achieve and Trade (PAT) scheme?
(A) National Solar Energy Expansion and Infrastructure Mission
(B) National Mission for Enhanced Energy Efficiency
(C) National Mission on Sustainable Habitat and Urban Planning
(D) National Water Resource Conservation and Management Mission

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measures
(C) Widespread implementation of adaptation measures will directly sequester greenhouse gases and lower global temperatures
(D) Treaties under the UNFCCC framework explicitly legally prohibit sovereign member nations from adopting a single strategy

128. What does "maladaptation" refer to in climate science?
(A) A highly successful regional climate adaptation policy that reduces net carbon emissions to zero within a decade
(B) Adaptation actions that unintentionally increase climate vulnerability or emissions
(C) The innate biological inability of native plant species to acclimate or survive in warmer terrestrial climates
(D) A climate risk mitigation strategy that relies exclusively on the international financial trading of carbon credits

129. Implementing agroforestry systems provides both mitigation and adaptation benefits. How does it serve as an adaptation strategy?
(A) By directly isolating and sequestering large quantities of atmospheric carbon within living tree trunk biomass
(B) By enhancing soil moisture, moderating microclimates, and diversifying income
(C) By dramatically increasing farmer reliance on synthetic nitrogenous chemical fertilisers to boost short-term yield
(D) By completely halting and preventing all natural biological emissions of nitrous oxide from agricultural soils

130. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): Expanding urban green spaces is an effective climate strategy.
Reason (R): Urban green spaces mitigate climate change by sequestering carbon and adapt to it by reducing the urban heat island effect.
In the context of the above statements, which one of the following is correct?
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

131. In line with the NAPCC, states in India have developed their own State Action Plans on Climate Change (SAPCC). Which nodal department generally coordinates the Uttar Pradesh SAPCC?
(A) The State Ministry and Department of Heavy Industries and Enterprise
(B) The Directorate of Environment under the UP Environment Department
(C) The State Department of Basic and Secondary Educational Infrastructure
(D) The State Election Commission and Public Administration Directorate

132. The Uttar Pradesh State Action Plan on Climate Change highlights specific vulnerability zones. Which region of UP is explicitly noted as highly vulnerable to drought and water scarcity?
(A) The northern Terai belt region
(B) The Bundelkhand region
(C) The central Rohilkhand region
(D) The fertile Western UP plains region

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133. Which major sector is a primary focus for adaptation strategies in the Uttar Pradesh SAPCC due to its high reliance on monsoon rains and significance to the state's economy?
(A) Information Technology and Telecommunications Services
(B) Deep-sea commercial fishing and marine aquaculture
(C) Agriculture and Allied Sectors
(D) Civil Aviation and Aerospace Transport Infrastructure

134. To combat climate change, the UP government frequently undertakes massive afforestation drives. What specific target is often associated with these annual "Van Mahotsav" plantation drives in the state?
(A) Exclusively planting exotic non-native timber tree species across public forest reserves
(B) Planting tens of crores of saplings during dedicated annual drives statewide
(C) Permanently converting all private agricultural crop lands into dense managed forest cover
(D) Deforesting designated urban green spaces to clear space for commercial utility solar parks

135. The UP State Action Plan on Climate Change stresses the improvement of water management.

(B) 2.5 to 3 billion tonnes of CO_2 equivalent
(C) 5 to 6 billion metric tonnes of CO_2 equivalent
(D) 10 billion metric tonnes of atmospheric CO_2 equivalent

103. Which financial framework is implicitly highlighted in India's NDCs as necessary from developed countries to help achieve its climate goals?
(A) Unregulated global cryptocurrency development grants
(B) Climate finance and technology transfer
(C) Bilateral military aid and defense equipment transfers
(D) Immediate and unconditional international debt cancellation

104. What is the fundamental concept behind a "carbon credit"?
(A) A mandatory surcharge levied directly on individual consumers purchasing petrol or diesel fuel
(B) A tradable permit allowing emission of one tonne of CO_2 or equivalent greenhouse gas
(C) A concessional financial loan extended by international banks to fund high-efficiency coal plants
(D) A physical voucher issued by governments to subsidise consumer energy-efficient home appliances

105. How does a "Cap and Trade" system work in carbon trading?
(A) The government legally mandates that industrial facilities capture 100% of their greenhouse emissions and store them underground
(B) A total emission limit is set, allowing lower emitters to trade surplus allowances with higher emitters
(C) Energy corporations trade crude oil and raw coal reserves exclusively priced according to their chemical carbon content
(D) The central government directly trades national carbon emission rights with foreign nations in exchange for disputed land territory

106. In India, the Energy Conservation (Amendment) Act, 2022 empowers the central government to specify a domestic market mechanism for which of the following?
(A) A national carbon credit trading scheme
(B) The international trading and disposal of high-level radioactive nuclear waste
(C) A domestic plastic recycling quota and commercial material exchange scheme
(D) A regulated national wildlife trade permit and commercial harvest quota

107. Who are the typical "buyers" in a voluntary carbon market?
(A) International environmental NGOs seeking to legally shut down heavily polluting industrial factories
(B) Entities seeking to voluntarily offset their carbon footprint
(C) Central banking institutions attempting to manage national inflation rates and interest rates
(D) Sovereign government agencies imposing regulatory financial penalties on small-scale agricultural farmers

108. Which term is used to describe a project (such as planting a forest) that removes greenhouse gases from the atmosphere, generating credits that can be sold?
(A) Carbon footprinting analysis
(B) Carbon offset project
(C) Carbon dumping operation
(D) Regulatory carbon taxing scheme

109. What is a common criticism or limitation of carbon trading systems?
(A) They inherently cause an immediate physical increase in atmospheric heat retention and global temperatures
(B) Risk of greenwashing if reductions lack verifiability or permanence
(C) They are explicitly classified as illegal financial activities under international treaties established by the UN
(D) They force energy-intensive manufacturing industries to permanently shut down all operations overnight

110. Match List I with List II**:**
List I: (Carbon Trading Term)
P. Allowance
Q. Offset
R. Cap
S. Baseline
List II: (Definition)
1. The maximum permitted level of emissions in a trading system
2. A credit generated by an emission reduction project outside the capped sector

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exclusive property rights and ownership over generated carbon credits
(D) International climate funds are restricted exclusively to sovereign island states bordering major ocean basins

144. How does the Green Climate Fund mobilise private sector investment for climate action?
(A) By levying a mandatory international corporate carbon tax on all commercial entities globally
(B) Using its Private Sector Facility to de-risk investments through concessional finance
(C) By legally requiring all commercial corporations to donate 2% of annual net profits to climate funds
(D) By directly selling verified regulatory carbon offset credits to multinational corporate entities

145. Consider the following statements regarding extreme weather events linked to climate change:
I. Warmer air holds more moisture, leading to heavier precipitation and floods.
II. Altered atmospheric circulation patterns can lead to prolonged dry spells and severe droughts.
III. The intensity of tropical cyclones is projected to increase due to warmer sea surface temperatures.
IV. Climate change completely prevents the occurrence of cold waves globally.
Which of the above statements is/are correct?
(A) I, II, and III only
(B) II, III, and IV only
(C) I, III, and IV only
(D) I, II, III, and IV

146. What is an "urban heat island" effect, which is exacerbated by global climate change?
(A) Urban centers experiencing cooler localized temperatures due to shadow coverage cast by high-rise buildings
(B) Urban zones having higher temperatures than rural surroundings due to pavement and heat retention
(C) The natural geographic heating of tropical islands situated within equatorial oceanic temperature belts
(D) The net localized cooling effect produced when municipal air conditioning systems vent heat outdoors

147. Flash droughts are becoming more common due to climate change. How does a flash drought differ from a conventional drought?
(A) It is triggered primarily by sudden extreme surges in regional rainfall rather than precipitation deficits
(B) Rapid drought onset driven by high temperatures, low rainfall, and elevated evaporation
(C) It occurs exclusively within hyper-arid desert biomes and sparsely populated continental interiors
(D) It persists continuously across geographical regions for multiple decades without any interruption

148. Which extreme weather event is directly responsible for coral bleaching?
(A) Extreme frost
(B) Marine heatwaves
(C) High-velocity hurricanes
(D) Heavy snowfall over the ocean

149. In Uttar Pradesh, the increasing frequency of extreme rainfall events concentrated in a few days leads to which twin problem?
(A) Severe winter frostbite and sudden mountain snow avalanches
(B) Urban flooding and severe soil erosion
(C) Oceanic tsunami waves and coastal land subsidence
(D) Subterranean earthquakes and catastrophic volcanic eruptions

150. Consider the following steps in the causal chain linking climate change to increased wildfire severity:
I. Higher atmospheric temperatures and early snowmelt
II. Ignition by lightning or human activity
III. Prolonged dry periods resulting in dry vegetation (fuel)
IV. Rapid spread of severe, hard-to-control wildfires
Which of the following represents the correct logical sequence of these steps?
(A) I, III, II, IV
(B) III, I, II, IV
(C) I, II, III, IV
(D) II, I, III, IV

151. Which term is used to describe an extreme weather pattern where a massive, slow-moving

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frequency of heatwaves and erratic monsoon precipitation. Elevated temperatures during critical growth phases cause heat stress, impairing flowering and seed development, while unpredictable rainfall distribution leads to crop damage, decreased water availability, and reduced overall crop yields across agricultural belts.

46. (D) It triggers the carbon fertilisation effect, initially enhancing photosynthetic rate and biomass
Elevated atmospheric carbon dioxide concentration enhances photosynthetic rates and improves water-use efficiency in C3 crops like wheat and rice under optimal conditions. Known as the carbon fertilization effect, this process initially increases biomass production. However, accompanying temperature increases, heat stress, and water limitations frequently offset these initial growth gains over time.

47. (A) Shifting from water-intensive sugarcane and paddy to drought-resistant millets
In Uttar Pradesh, climate change alters seasonal rainfall distribution and increases water stress. To adapt to declining groundwater levels and erratic monsoon patterns, agricultural planning involves transitioning from water-intensive traditional crops like sugarcane and paddy toward climate-resilient, drought-tolerant alternatives such as millets, ensuring sustainable food production under changing climatic conditions.

48. (D) They accelerate nighttime dark respiration, consuming carbohydrates and lowering crop yields
Higher nighttime temperatures accelerate plant metabolic processes, specifically dark respiration. Instead of conserving energy stored through daytime photosynthesis, crops expend excessive accumulated carbohydrates during warm nights. This accelerated cellular respiration reduces the net daily biomass accumulation available for grain development, ultimately decreasing crop yields in important food crops.

49. (B) Coastal seawater intrusion combined with intense inland soil evaporation
Sea-level rise causes coastal seawater intrusion into low-lying agricultural land and coastal aquifers. Simultaneously, warmer inland temperatures drive high soil surface evaporation rates, drawing saline groundwater upward through capillary action. These combined processes accumulate harmful sodium salts in topsoil layers, severely exacerbating agricultural soil salinity and reducing crop productivity.

50. (A) P-4, Q-3, R-1, S-2
Heat stress during flowering induces grain abortion and reduces seed setting. Erratic monsoon rainfall disrupts agricultural calendars, leading to delayed sowing and crop failure. Warmer winter temperatures diminish required cold periods, impairing wheat vernalization. Increased flood frequency causes excessive field waterlogging and severe topsoil erosion across agricultural landscapes.

51. (B) Thermal expansion of ocean water combined with the melting of land-based ice sheets and glaciers
Global sea-level rise is primarily driven by two interrelated climate mechanisms. First, warming global temperatures cause thermal expansion, where seawater expands as it absorbs atmospheric heat. Second, elevated temperatures accelerate the melting of land-based glaciers and ice sheets in Greenland and Antarctica, adding massive freshwater volumes directly into global oceans.

52. (A) Mangrove forests
Mangrove forests form critical intertidal ecosystems along tropical and subtropical coastlines. Their dense root structures dissipate wave energy, stabilize coastal soils, and protect shorelines against storm surges and rising sea levels. However, rapid sea-level rise and coastal development threaten mangroves with inundation and squeeze when physical space for inland migration is restricted.

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53. (B) Through saltwater intrusion into coastal aquifers, rendering groundwater unsafe for drinking and irrigation
Rising ocean levels alter subterranean hydraulic pressure gradients between marine and terrestrial water bodies. Elevated sea levels push dense saltwater further inland into coastal freshwater aquifers, a process known as saltwater intrusion. This contamination degrades coastal groundwater quality, making critical freshwater resources unfit for agricultural irrigation and human consumption.

and acidification, is published annually by which organisation?
(A) World Meteorological Organization (WMO)
(B) World Health Organization Secretariat (WHO)
(C) International Energy Agency Executive Board
(D) World Trade Organization General Council

160. Which report is released periodically by the Indian government detailing the state's forest cover, which is critical for estimating carbon sinks?
(A) The Annual Economic Survey Report of India
(B) India State of Forest Report (ISFR)
(C) The National Climate and Carbon Census
(D) National Biological Diversity Status Report

161. According to the IPCC AR6, what does the term "tipping point" mean in the climate system?
(A) The specific calendar date annually when average ambient atmospheric temperatures drop below freezing
(B) Threshold where a climate system reorganizes abruptly or irreversibly
(C) The exact chronological milestone when net anthropogenic carbon emissions reach absolute zero globally
(D) The exact financial break-even timeline for utility-scale renewable energy infrastructure investments

162. A recent major international report on biodiversity, heavily featuring climate impacts, was released by IPBES. What does IPBES stand for?
(A) Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
(B) International Panel on Transnational Biological, Environmental, and Ecological Security
(C) Indian National Research Programme for Biodiversity and Environmental Protection Studies
(D) International Legal Protocol for Global Botanical and Ecological Standardisation

163. What is the primary objective of Mission Innovation, a global initiative associated with clean energy?
(A) To research, develop, and commercialize novel engineering techniques to extract deep-sea petroleum reserves
(B) Accelerating research and investment to make clean energy affordable and accessible
(C) To enforce strict international regulatory frameworks restricting the cross-border transfer of solar technology
(D) To construct nuclear armament facilities using innovative clean energy grid infrastructure and tech

164. Under the National Solar Mission of India, what innovative concept is promoted to overcome the shortage of land for large-scale solar installations?
(A) Subterranean underground solar photovoltaic farms
(B) Floating solar power plants on reservoirs and lakes
(C) Legally prohibiting agriculture to clear rural land for utility solar arrays
(D) Deploying large-scale photovoltaic solar panel constellations into orbit

165. The "PM Surya Ghar: Muft Bijli Yojana" recently launched by the Government of India aims to boost which sector of clean energy?
(A) Commercial offshore wind energy turbine installations
(B) Large-scale hydro-electric dam generation projects
(C) Rooftop solar power systems for households
(D) Deep geothermal energy plant infrastructure facilities

166. What is a "Solar Park" in the context of India's clean energy policy?
(A) A municipal public park equipped exclusively with outdoor solar-powered streetlights and park bench chargers
(B) A designated development zone offering solar projects plug-and-play infrastructure
(C) A specialized urban commercial parking facility reserved exclusively for charging battery electric vehicles
(D) A protected natural forest area converted entirely into an industrial clean technology manufacturing zone

167. Why is climate literacy considered crucial for effective climate action?
(A) It guarantees that every educated citizen attains professional scientific qualifications in meteorology
(B) It empowers citizens to make informed climate choices and support policies
(C) It establishes enforceable laws compelling

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high-pressure area causes persistent hot weather over a region, sometimes for weeks?
(A) Polar vortex
(B) Heat dome
(C) Atmospheric river
(D) Cyclone eye

152. What is the widely accepted definition of a "climate refugee"?
(A) An activist traveling internationally specifically to participate in organized political climate protests
(B) A person displaced from home by environmental changes threatening survival or livelihood
(C) A professional atmospheric scientist conducting field research on environmental change in foreign countries
(D) An individual high-net-worth investor evading national carbon tax liabilities by relocating offshore

153. Does international law currently recognise "climate refugees" under the 1951 Refugee Convention?
(A) Yes, climate displaced individuals receive automatic political asylum across all sovereign developed nations
(B) No, the 1951 Convention strictly applies to persecution based on race, religion, or political grounds
(C) Yes, displaced individuals receive standardized international refugee passports issued directly by the UN
(D) No, because international legal frameworks do not recognize environmental factors as valid migration drivers

154. Which phenomenon is a primary driver forcing people to become climate refugees from small island developing states (SIDS) like Kiribati or Tuvalu?
(A) Catastrophic submarine volcanic eruptions
(B) Sea-level rise and saltwater intrusion
(C) Rapid expansion of arid inland desert ecosystems
(D) Accelerated melting of high-altitude tropical glaciers

155. Climate-induced migration can lead to "resource conflicts" in host regions. What does this refer to?
(A) Cooperative sharing of unlimited natural resources between displaced migrant populations and local communities
(B) Tensions over scarce resources like land, water, and food where displaced populations settle
(C) Sovereign host governments exporting domestic natural resource reserves to fully fund refugee operations
(D) The accelerated technological discovery of rich unexploited fossil fuel reserves by displaced populations

156. In the context of climate displacement, what is "planned relocation"?
(A) Unregulated emergency evacuation and chaotic fleeing of citizens during severe coastal flash flood disasters
(B) Proactively relocating communities from vulnerable areas before disaster strikes
(C) The compulsory legal deportation of foreign national citizens convicted of committing major environmental crimes
(D) State-mandated forced migration policies transferring urban municipal populations into rural forest zones

157. Which recent landmark report provides the most comprehensive scientific assessment of climate change, confirming that human influence has warmed the atmosphere, ocean, and land?
(A) The IPCC Sixth Assessment Report (AR6)
(B) The Kyoto Protocol Technical Summary Document
(C) The Brundtland Commission Report on Sustainability
(D) The UN Millennium Ecosystem Assessment Synthesis Report

158. According to recent UNEP Emissions Gap Reports, what is the "emissions gap"?
(A) The physical size of the stratospheric ozone layer depletion hole recorded annually over the Antarctic continent
(B) Difference between planned emissions under pledges and levels needed to limit warming to 1.5°C
(C) The absolute quantitative gap in total annual industrial greenhouse gas emissions between China and the United States
(D) The financial discrepancy measured between officially reported carbon tax obligations and actual tax revenue collected

159. The "State of the Global Climate" report, which outlines key climate indicators like ocean heat

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ANSWERS

1. (B) Long-term alterations in global or regional temperature and typical weather patterns
Climate change refers to significant and lasting shifts in global or regional climate metrics over extended timeframes, typically spanning decades or centuries. It encompasses both natural climate variability and human-driven changes that alter atmospheric composition and surface temperatures. Unlike day-to-day weather fluctuations, these long-term alterations transform baseline climate patterns worldwide.

2. (C) 30 years
The World Meteorological Organization defines standard climate normals as statistical averages of atmospheric variables computed over a consecutive thirty-year period. This specific duration balances short-term weather anomalies and long-term climate trends. Evaluating thirty years of meteorological observations enables scientists to establish reliable reference baselines to track global climate shifts effectively.

3. (A) Weather describes atmospheric conditions over a short period, whereas climate is how the atmosphere behaves over relatively long periods
Weather refers to instantaneous or short-term atmospheric conditions such as temperature, humidity, wind, and precipitation experienced at a specific time and location. In contrast, climate represents the long-term statistical mean and variability of weather patterns recorded over decades. Understanding this temporal distinction is fundamental when analyzing atmospheric dynamics and climate trends.

4. (C) Paleoclimatology
Paleoclimatology is the specialized scientific study of Earth's historic atmospheric conditions prior to the availability of modern instrumental records. Scientists utilize natural proxy records including ice cores, tree rings, cave deposits, and marine sediment cores to reconstruct past thermal and hydrological regimes. This historical perspective helps contextualize current global climate changes.

5. (A) It provides a historical baseline to evaluate long-term climate trends
A baseline period serves as a fixed chronological reference point against which current and future climate observations are systematically measured. Establishing an absolute reference timeframe allows climatologists to calculate temperature anomalies, assess long-term trend shifts, and distinguish natural internal variability from human-induced external forcing mechanisms operating within Earth's complex climate system.

6. (D) A persistent upward trend in global mean surface temperatures over fifty years
Climate change is identified by statistically significant changes in mean climate states persisting over several decades. While individual storm events, severe winters, or brief regional droughts represent temporary weather variability, a sustained multi-decadal global temperature increase demonstrates a fundamental shift in the planetary climate balance caused by persistent radiative forcing factors.

7. (B) It emits stratospheric sulphur dioxide aerosols that reflect solar radiation and cool the planet
Explosive volcanic eruptions inject large amounts of sulphur dioxide gas into the stratosphere, where it undergoes chemical reactions to form fine sulphate aerosols. These aerosol particles scatter incoming shortwave solar radiation back into space, thereby increasing Earth's planetary albedo. This process causes a temporary, global-scale surface cooling effect for several years.

8. (C) Milankovitch cycles
Milankovitch cycles describe cyclical shifts in Earth's orbital parameters, including orbital eccentricity, axial tilt obliquity, and axial precession. Occurring over tens to hundreds of thousands of years, these orbital variations alter the spatial and seasonal distribution of incoming solar radiation across the globe, driving historical glacial and interglacial ice age periods.

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individual citizens to immediately stop consuming electricity

(D) It completely replaces and eliminates the requirement for formal scientific education in public schools

168. Which Indian government ministry actively runs the National Green Corps 'Eco-Club' programme to impart environmental and climate literacy to school children?

(A) Union Ministry of Earth Sciences and Oceanic Research

(B) Ministry of Environment, Forest and Climate Change

(C) Union Ministry of New and Renewable Energy Resources

(D) Union Ministry of Science and Technology Infrastructure

169. What is the core philosophy behind the 'LiFE' (Lifestyle for Environment) movement introduced by India globally?

(A) Promoting mindful resource utilization over destructive consumption

(B) Mandating absolute individual asceticism and the complete public renunciation of all modern technology

(C) Enacting strict penal laws that criminally prosecute individual consumers for buying non-organic food

(D) Shifting the entirety of climate responsibility and financial liability solely onto corporations

170. Which of the following is a common public awareness tool used by state forest departments, including UP, to highlight climate protection during the Wildlife Week?

(A) Distributing free motor fuel subsidies to encourage citizens to drive private vehicles to national parks

(B) Holding school debate and painting contests on conservation and climate topics

(C) Promoting and subsidising the widespread commercial retail sale of non-native exotic wild pet animals

(D) Encouraging local rural populations to actively hunt and cull invasive animal species using firearms

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18. (D) Commercial refrigeration and air conditioning systems
Hydrofluorocarbons are synthetic fluorinated chemicals specifically developed to replace ozone-depleting substances in commercial refrigeration, air conditioning units, heat pumps, and foam-blowing applications. Although hydrofluorocarbons do not harm the ozone layer, they function as extremely potent greenhouse gases with heat-trapping capabilities thousands of times greater than carbon dioxide on a per-molecule basis.

19. (A) Greenhouse gases allow incoming shortwave solar radiation through but absorb and re-emit outgoing longwave infrared heat
Incoming high-energy shortwave solar radiation passes relatively unhindered through greenhouse gases to warm Earth's surface. The warmed surface then re-radiates lower-energy longwave thermal infrared radiation upward. Atmospheric greenhouse gases absorb this outgoing infrared radiation and re-emit heat energy in all directions, trapping thermal energy within the troposphere and warming the planet.

20. (A) P-2, Q-4, R-1, S-3
Carbon dioxide is mainly emitted from fossil fuel combustion in power generation and transport. Methane originates primarily from landfills and ruminant livestock enteric fermentation. Nitrous oxide stems predominantly from agricultural soil management involving synthetic fertilisers. Fluorinated gases are manufactured synthetic chemicals utilized as refrigerants and specialized industrial solvents in commercial cooling systems.

21. (A) Water vapour
Water vapour is the most abundant natural greenhouse gas in Earth's atmosphere, generating the majority of the natural greenhouse warming effect. Unlike long-lived greenhouse gases, atmospheric water vapour concentration is controlled primarily by air temperature and evaporation rates rather than direct human emissions, forming an important climate feedback loop in response to global warming.

22. (D) Energy absorbed by emitting 1 ton of a gas over time relative to 1 ton of CO_2
Global Warming Potential quantifies the relative heat-trapping effectiveness of a specific greenhouse gas over a given time horizon, typically one hundred years. It measures how much energy one ton of a gas absorbs compared to one ton of carbon dioxide, establishing a standardized baseline metric for comparing different greenhouse gas impacts.

23. (B) Sulphur hexafluoride (SF_6)
Sulphur hexafluoride is an extremely potent synthetic greenhouse gas primarily used as an electrical insulator in high-voltage equipment. Due to its exceptional chemical stability and long atmospheric lifetime of over three thousand years, its Global Warming Potential over a one-hundred-year timescale is approximately twenty-three thousand five hundred times greater than carbon dioxide.

24. (C) Through photochemical reactions of VOCs and NOx in sunlight
Ground-level tropospheric ozone is a secondary air pollutant and greenhouse gas created through chemical reactions in the lower atmosphere. Sunlight drives complex photochemical reactions between precursor pollutants, specifically volatile organic compounds and nitrogen oxides emitted by industrial facilities and motor vehicles. Elevated ground-level ozone concentrations trap heat and damage plant tissues.

25. (A) I, II, and IV only
Natural greenhouse gases maintain Earth's thermal balance above freezing. Carbon dioxide causes the majority of human-induced greenhouse warming, and human industrial activity drives the enhanced greenhouse effect. Outgoing longwave radiation is absorbed rather than freely passing into space, rendering statement three incorrect while statements one, two, and four are scientifically accurate.

26. (B) The continuous reduction in Arctic sea ice extent
The steady multi-decadal shrinkage of Arctic sea ice extent and thickness provides direct physical evidence of accelerating global warming. Higher atmospheric and oceanic temperatures cause extensive summer sea ice melting, reducing planetary albedo and exposing darker ocean waters. This fundamental transformation highlights the sensitivity of polar systems to global climate warming trends.

27. (B) Thermal expansion
Thermal expansion occurs when seawater absorbs excess atmospheric heat, causing

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9. (D) It causes a minor increase in the Earth's average global temperature
Sunspot activity follows an approximate eleven-year solar cycle, during which periods of peak magnetic activity produce increased solar irradiance. Although the overall change in the solar constant is relatively small, this minor radiative forcing enhancement adds extra thermal energy to Earth's atmospheric system, causing a slight, measurable increase in average global temperatures.

10. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Major explosive volcanic events eject volcanic ash and gaseous sulphur compounds high into the stratospheric layer. Sulphur dioxide converts into sulphate aerosols that remain suspended for months to years, reflecting incoming sunlight away from Earth. This reduction in solar radiation reaching the surface directly accounts for the observed temporary global cooling phenomenon.

11. (B) The El Nino-Southern Oscillation (ENSO)
The El Nino-Southern Oscillation is a major periodic climate phenomenon involving fluctuations in tropical Pacific sea surface temperatures and atmospheric pressure patterns. Alternating between El Nino warm phases and La Nina cool phases, this coupled ocean-atmosphere interaction disrupts global jet streams, dramatically shifting tropical rainfall and weather systems across the globe.

12. (B) Continental positions, altering global ocean currents and heat transport
Over geological timescales, plate tectonics alters the configuration of landmasses, mountain chains, and ocean basins across Earth's surface. Shifting land positions reshape thermohaline oceanic circulation and atmospheric circulation pathways, fundamental mechanisms that redistribute equatorial solar heat toward polar regions. Consequently, continental drift drives deep, long-term shifts in global climate regimes.

13. (A) Combustion of fossil fuels for energy and transport
The burning of fossil fuels such as coal, oil, and natural gas for electricity, industrial processes, and transportation represents the predominant driver of anthropogenic carbon dioxide emissions. Unearthing and combusting ancient biological carbon deposits releases massive quantities of stored carbon into the atmosphere, greatly enhancing the global greenhouse effect over short timeframes.

14. (C) By reducing photosynthetic trees, leaving more carbon dioxide in the atmosphere
Forests serve as critical biological carbon sinks by continuously absorbing atmospheric carbon dioxide through natural photosynthesis. Deforestation eliminates these living biomass pools and halts photosynthetic carbon capture. Furthermore, burning or decomposing cleared vegetation releases stored carbon back into the atmosphere, accelerating the accumulation of greenhouse gases in Earth's lower atmosphere.

15. (A) I and II only
Synthetic nitrogen fertilisers used in industrial agriculture break down to emit nitrous oxide, a powerful greenhouse gas. Cement production releases substantial carbon dioxide during limestone calcination and energy consumption. Chlorofluorocarbons act as strong greenhouse gases that warm the troposphere, making statement three scientifically incorrect while statements one and two remain accurate.

16. (C) Converting natural forest ecosystems into urban concrete infrastructure
Land-use change refers to human modification of natural landscapes for urban or agricultural development. Converting natural forest ecosystems into built urban infrastructure destroys carbon-absorbing vegetation, alters surface albedo, and increases local heat storage. This transformation represents a major anthropogenic driver of regional climate shifts and elevated global greenhouse gas emissions.

17. (B) Methane
Ruminant livestock like cattle and sheep generate significant volumes of methane gas through enteric fermentation during normal digestive processes. Methane is also released during manure decomposition under anaerobic storage conditions. Because methane possesses a high heat-trapping capacity, agricultural livestock production represents a major contributor to short-term anthropogenic global warming trends.

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fossil fuel consumption. Upgrading insulation, utilizing energy-efficient appliances, and switching to clean power significantly decrease direct and indirect residential greenhouse gas emissions, serving as one of the most effective personal footprint reduction measures.

37. (B) ISO 14064
ISO 14064 is an internationally recognized standard providing organizations with clear frameworks for quantifying, monitoring, reporting, and verifying greenhouse gas emissions and carbon footprints. It establishes standardized principles for corporate carbon accounting, helping entities structure transparent emission inventories, facilitate independent verification, and implement effective corporate climate mitigation strategies.

38. (B) By intensifying wildfires and shifting species ranges to higher elevations and latitudes
Climate change alters forest ecosystem dynamics by raising ambient temperatures and exacerbating drought conditions. These factors increase forest wildfire frequency and intensity while altering optimal growing conditions. Consequently, tree species ranges progressively migrate toward higher elevations and cooler northern latitudes to remain within their thermal tolerance zones, restructuring forest biomes.

39. (A) Drying wetland swamps, threatening endemic species like the swamp deer
In Uttar Pradesh, climate change alters hydrological patterns within the sensitive Terai ecosystem. Rising temperatures and erratic precipitation dry out low-lying wetland swamps and marshes. This habitat degradation threatens specialized endemic wildlife species, such as the swamp deer, which rely directly on persistent wetland conditions for feeding and breeding cycles.

40. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Increased atmospheric carbon dioxide leads to elevated absorption of carbon dioxide gas by ocean surface waters, forming carbonic acid and reducing seawater pH. This ocean acidification process lowers carbonate ion concentrations, significantly impairing the ability of marine organisms, like corals, to build calcium carbonate structures, directly threatening reef biodiversity.

41. (C) When interacting species alter seasonal activity timing at asynchronous rates
Phenological mismatch occurs when interdependent species adjust the timing of seasonal life cycles at unequal rates in response to climate warming. For example, if insect emergence occurs earlier due to warmer temperatures but migratory bird arrivals do not shift, food availability for nestlings drops, severely disrupting established ecological interactions and food webs.

42. (D) Forest dieback, converting forest sinks into net carbon sources
Forest dieback describes widespread mortality across forest stands induced by severe environmental stress, such as prolonged drought, extreme heat waves, or pest infestations. As large numbers of trees die and decompose, photosynthetic carbon uptake ceases while decomposition releases trapped carbon, transforming historical forest carbon sinks into active net sources of carbon.

43. (B) Warming and altered rainfall create conditions favoring fast colonizing, adaptable species
Climate change alters temperature regimes and rainfall distribution, creating environmental disturbances that stress native plant communities. Highly adaptable invasive alien species often possess broader ecological tolerances and rapid reproduction capabilities. Consequently, they rapidly colonize disturbed ecosystems, outcompeting weakened native flora and dominating forest understories under shifting regional climate regimes.

44. (A) Permeable skin makes them highly sensitive to temperature and moisture changes
Amphibians possess highly permeable skin and eggs, making them exceptionally vulnerable to changes in ambient temperature, moisture levels, and water availability. Climate-induced thermal stress and shifting hydrologic patterns dry out essential breeding habitats and increase susceptibility to disease pathogens like chytrid fungus, driving widespread amphibian population declines globally.

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45. (B) Reduced crop yields resulting from severe heat stress and erratic monsoon rainfall patterns
Indian agricultural productivity faces severe challenges from climate change due to increasing

water molecules to expand and occupy greater physical volume. As global ocean temperatures rise due to enhanced thermal trapping, thermal expansion accounts for a substantial proportion of global sea-level rise, acting alongside land-based ice sheet and glacier meltwater discharge into marine systems.

28. (D) Earlier spring onset, including flower blooming and bird migration
Biological systems respond dynamically to changing climate signals across terrestrial biomes. Warming spring temperatures cause earlier onset of seasonal biological events, known as phenology shifts. Plants flower earlier, trees leaf out sooner, and migratory bird species adjust their seasonal arrival dates, providing clear biological indicators of long-term global surface temperature increases across ecosystems.

29. (C) Energy demand needed to cool buildings during warmer outdoor weather
A cooling degree day is a standard metric used to quantify energy demand required to cool indoor spaces. It reflects the extent to which daily outdoor ambient temperatures exceed a base comfort threshold. Rising global temperatures increase cooling degree days, indicating growing electrical power demand for air conditioning systems during extended warm weather.

30. (A) It deepens the active layer, thawing permafrost and releasing trapped greenhouse gases
Global warming raises high-latitude air temperatures, increasing the seasonal thaw depth of permafrost active layers. Thawing ground destabilizes Arctic ecosystems and accelerates microbial decomposition of long-stored organic matter. This process releases massive quantities of carbon dioxide and methane into the atmosphere, creating a major positive feedback loop that amplifies global climate warming.

31. (B) Higher frequency and intensity of extreme heavy precipitation events
Warmer atmospheric temperatures increase atmospheric moisture-holding capacity according to thermodynamic principles. Consequently, a warmer atmosphere holds and transports greater volumes of water vapour, leading to an increased frequency and intensity of extreme rainfall events globally. This shift alters regional hydrological regimes and increases local flash flood risks substantially.

32. (D) The total greenhouse gases emitted directly or indirectly by human activities
A carbon footprint measures the total volume of greenhouse gas emissions generated directly or indirectly by a specific individual, organization, event, or product. Expressed across all stages of activity, this metric provides a practical standardized evaluation tool to quantify individual climate impact and identify target areas for effective emission reduction strategies.

33. (B) Carbon dioxide (CO_2 eq)
Carbon footprints summarize the combined climatic impact of various greenhouse gases, including methane, nitrous oxide, and fluorinated gases. To create a unified measurement standard, emissions are calculated based on their respective global warming potentials and expressed in terms of carbon dioxide equivalents, standardizing multi-gas emissions into one comparable numerical metric.

34. (B) Direct emissions from owned or controlled operational facilities and vehicles
Under standard greenhouse gas accounting protocols, Scope 1 emissions encompass all direct greenhouse gas releases from sources owned or directly controlled by an organization. This category includes fuel combustion in commercial boilers, industrial furnaces, manufacturing process equipment, and company-operated transport fleets, distinguishing them from indirect upstream or downstream enterprise emissions.

35. (A) I and II only
Life-cycle assessments evaluate total environmental impacts across product life spans. Diets rich in livestock products carry high carbon footprints due to agricultural methane and land use. Transportation emissions are fully included in carbon footprint assessments, making statement three false while statements one and two correctly describe standard carbon accounting methodologies.

36. (D) Adopting renewable energy providers and upgrading household energy efficiency
Transitioning household electricity supply to clean renewable energy sources and upgrading energy efficiency directly eliminates underlying

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54. (C) The emergence of climate refugees
Permanent coastal inundation caused by rising sea levels forces low-lying and island communities to abandon flooded homes and ancestral lands. This forced displacement creates climate refugees, presenting severe socioeconomic challenges regarding human migration, legal status, international protection, housing rights, loss of cultural heritage, and resource distribution in host communities.

55. (B) I, III, and IV only
Rising sea levels accelerate coastal erosion, threaten low-lying island states like the Maldives with permanent submergence, and disrupt estuarine salinity balances. However, higher sea levels increase rather than decrease storm surge devastation during coastal cyclones, making statement two false while statements one, three, and four are correct scientific conclusions.

56. (B) Transgression
Coastal transgression describes the natural landward movement of shoreline habitats, such as salt marshes and mangroves, in response to rising sea levels. When coastal land slope allows and physical human barriers are absent, coastal ecosystems gradually shift inland over time, maintaining their intertidal ecological position relative to elevated sea levels.

57. (B) Initial increased river flow and flooding, followed by reduced dry-season flow as glaciers shrink
Accelerated melting of Himalayan glaciers initially increases river water discharge and flood risks across Northern India. However, as glacier volumes diminish over time, meltwater contributions peak and subsequently decline. This long-term shrinkage leads to reduced seasonal river flows during dry summer months, threatening sustained water supply for millions dependent on these river systems.

58. (B) Failure of a moraine dam holding a glacial lake, releasing massive downstream water flow
A Glacial Lake Outburst Flood occurs when unstable natural dams composed of loose glacial moraine debris fail structurally. Rapid glacier retreat leaves behind large meltwater lakes bounded by fragile moraines. When these natural dams breach due to heavy rainfall, ice avalanches, or seismic activity, immense volumes of water surge downstream, causing devastating flash floods.

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59. (B) The ice-albedo positive feedback loop
The ice-albedo positive feedback loop occurs because highly reflective snow and ice possess high surface albedo, reflecting most incoming solar energy back into space. When rising global temperatures melt ice cover, darker underlying land or ocean surfaces are exposed. These darker surfaces absorb significantly more solar thermal energy, accelerating warming and driving further ice loss.

60. (A) Decreased glacial mass → Reduced meltwater during summers → Water scarcity for agriculture → Lower crop yields
Long-term glacial retreat reduces total glacial ice mass, leading to diminished summer meltwater discharge into mountain river basins over time. This reduction in reliable water flow creates severe summer water scarcity for downstream agricultural irrigation systems. Consequently, insufficient irrigation water availability directly impairs crop growth, resulting in lower agricultural yields.

61. (B) It jeopardises power generation due to erratic flows and lower long-term baseflow
Mountain hydroelectric power generation relies on consistent seasonal river discharge to drive turbines efficiently. Glacial retreat creates highly variable river flow regimes, characterized by intense seasonal flood spikes during early melting phases followed by reduced long-term summer baseflows. This flow unpredictability and increased sediment loading threaten long-term operational stability and energy output.

62. (A) Natural reservoirs slowly releasing meltwater during low rainfall periods
Mountain glaciers act as natural high-altitude freshwater reservoirs within global hydrological systems. During dry, low-rainfall seasons, gradual ice melting provides crucial baseflow into downstream river networks. This continuous water supply sustains river ecosystems, agricultural irrigation systems, and human settlements during periods when seasonal precipitation is minimal across river basins.

63. (B) Intergovernmental Panel on Climate Change
The Intergovernmental Panel on Climate Change is the primary United Nations body dedicated to

102. (B) 2.5 to 3 billion tonnes of CO_2 equivalent
In its original Nationally Determined Contribution submitted in 2015, India pledged to create an additional carbon sink through expanding forest cover. Specifically, the target aims to sequester an additional 2.5 to 3 billion metric tonnes of carbon dioxide equivalent through comprehensive afforestation and tree planting efforts by 2030.

103. (B) Climate finance and technology transfer
India's climate targets explicitly highlight the necessity of international support from developed nations. Securing adequate climate finance and low-cost technology transfer under UNFCCC frameworks is considered essential for developing countries to scale up renewable energy infrastructure, implement adaptation strategies, and meet national decarbonization objectives without compromising economic development.

104. (B) A tradable permit allowing emission of one tonne of CO_2 or equivalent greenhouse gas
A carbon credit is a standardized, tradable financial permit representing the right to emit one metric tonne of carbon dioxide or an equivalent amount of another greenhouse gas. Generated through verified emission reduction or sequestration projects, these credits allow entities to offset emissions by purchasing certificates from clean energy or forestry initiatives.

105. (B) A total emission limit is set, allowing lower emitters to trade surplus allowances with higher emitters
Cap and trade systems establish an overall legal limit on total greenhouse gas emissions across covered industrial sectors. Regulated entities receive or purchase carbon allowances up to this cap. Facilities that reduce emissions below assigned allowances can sell surplus permits to higher-emitting entities, creating financial incentives for cost-effective industry-wide emissions reductions.

106. (A) A national carbon credit trading scheme
The Energy Conservation Amendment Act passed in 2022 empowers the central government to establish a domestic carbon credit trading scheme in India. This legislative framework authorizes specified consumer entities to earn or trade carbon credits, creating a structured market mechanism to incentivize energy efficiency and industrial decarbonization across domestic commercial sectors.

107. (B) Entities seeking to voluntarily offset their carbon footprint
Voluntary carbon markets operate independently of legal government mandates. Typical buyers in these markets include private corporations, institutions, and individuals seeking to fulfill corporate sustainability goals or balance personal carbon footprints. These entities voluntarily purchase verified carbon offset credits generated by environmental initiatives such as renewable energy and afforestation projects.

108. (B) Carbon offset project
A carbon offset project is a structured initiative that removes, reduces, or avoids greenhouse gas emissions, such as forest restoration or renewable energy deployment. These projects generate verified carbon credits representing quantified emission reductions, which can be sold in carbon markets to offset emissions produced elsewhere by commercial entities or individuals.

109. (B) Risk of greenwashing if reductions lack verifiability or permanence
A major criticism of carbon trading mechanisms involves the risk of greenwashing, where entities buy cheap carbon credits instead of directly reducing operational emissions. If carbon offset projects lack strict additionality, independent verifiability, or long-term permanence, carbon trading fails to produce genuine net global emission reductions, undermining climate mitigation goals.

110. (A) P-3, Q-2, R-1, S-4
An allowance is a permit granting specific emission rights. An offset credit is generated by verified reduction projects outside capped sectors. The cap represents the maximum permitted system emissions limit. The baseline serves as a historical reference point against which future emission reductions or increases are formally measured.

111. (C) Wind energy
Wind energy converts the kinetic energy of atmospheric air currents into mechanical power and clean electricity using specialized wind turbines. Because wind turbine power generation produces zero direct greenhouse gas emissions during operation, expanding onshore and offshore

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climate framework designed to limit global warming and enhance international climate resilience across all participating nations.

73. (C) Achieving Net Zero by 2070
At the COP 26 climate conference in Glasgow in 2021, India presented its Panchamrit strategy outlining five major climate commitments. The central long-term milestone of this framework was India's explicit pledge to achieve Net Zero greenhouse gas emissions by the year 2070, balancing human carbon emissions with equivalent carbon removals.

74. (C) COP 24
COP 24, held in Katowice, Poland, in 2018, established the comprehensive operational rulebook for implementing the Paris Agreement. Known as the Katowice Climate Package, this framework finalized practical guidelines for tracking national emissions, monitoring climate finance, evaluating progress, and implementing operational mechanisms under the Paris Agreement starting in 2020.

75. (B) 2.0°C
Article 2 of the Paris Agreement sets a central goal to hold the increase in global average temperature to well below two degrees Celsius above pre-industrial levels. This international target was established to significantly limit severe global climate risks, ecosystem disruptions, sea-level rise, and catastrophic weather impacts across global human and natural systems.

76. (B) 1.5°C
In addition to its primary goal, the Paris Agreement explicitly commits participating nations to pursue active efforts to limit global average temperature increases to 1.5 degrees Celsius above pre-industrial baselines. Scientific assessments demonstrate that keeping warming to 1.5 degrees significantly reduces climate hazards, extreme heat events, and irreversible environmental tipping points worldwide.

77. (B) Nationally Determined Contributions (NDCs)
The Paris Agreement utilizes a bottom-up governance structure centered on Nationally Determined Contributions. Under this framework, each participating country formulates, communicates, and maintains self-defined national targets for greenhouse gas emission reductions and adaptation strategies, reflecting national capabilities and socioeconomic circumstances while updating these pledges on a regular five-year cycle.

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78. (B) A 5-year assessment of collective progress toward Paris Agreement goals
The Global Stocktake is a fundamental Paris Agreement mechanism designed to assess collective international progress toward long-term climate goals every five years. By evaluating worldwide emission reductions, adaptation actions, and climate finance flows, this comprehensive assessment informs nations when updating their Nationally Determined Contributions, driving increased ambition over successive planning cycles.

79. (B) The rule that successive NDCs must show progression and higher ambition
The ratchet mechanism under the Paris Agreement requires that each successive set of Nationally Determined Contributions submitted by a participating country must represent a clear progression beyond its previous submission. This rule prevents nations from lowering targets and ensures that international climate commitments incrementally scale up emission reduction ambition over time.

80. (A) P-3, Q-1, R-4, S-2
The UNFCCC established the baseline framework for stabilizing greenhouse gas concentrations. The Kyoto Protocol set legally binding targets for developed nations. The Paris Agreement introduced Nationally Determined Contributions for all member countries. COP 27 concluded with the landmark agreement to establish a Loss and Damage Fund for vulnerable nations.

81. (B) Paris requires all nations to submit pledges, while Kyoto targeted only developed countries
A fundamental difference between these climate treaties lies in their participation structure. The Kyoto Protocol imposed legally binding emission reduction targets exclusively on Annex I developed countries. Conversely, the Paris Agreement engages all participating nations by requiring both developed and developing countries to submit and regularly update Nationally Determined Contributions.

assessing scientific knowledge surrounding climate change. Established to provide policymakers with objective scientific evaluations, the organization synthesizes global scientific literature regarding climate drivers, future environmental risks, potential socioeconomic impacts, and feasible adaptation and mitigation pathways.

64. (B) World Meteorological Organization (WMO) and United Nations Environment Programme (UNEP)
The IPCC was jointly established in 1988 by the World Meteorological Organization and the United Nations Environment Programme. Endorsed by the United Nations General Assembly, this international body was formed to synthesize scientific literature, providing sovereign governments with clear, comprehensive assessments of global climate change mechanisms and prospective policy options.

65. (B) II only
The IPCC does not conduct primary scientific research or collect original climate data directly. Instead, thousands of scientific experts review and synthesize published peer-reviewed scientific literature to produce assessment reports. These reports are strictly policy-relevant rather than policy-prescriptive, making statement two correct while statements one and three are inaccurate descriptions.

66. (C) The Physical Science Basis of climate change
Working Group I of the IPCC focuses specifically on assessing the physical science basis of the climate system and climate change. It evaluates scientific research regarding atmospheric drivers, greenhouse gas concentrations, paleoclimate data, climate modeling simulations, temperature trends, and physical attribution of observed global warming to human activity and natural factors.

67. (B) Assessment Report
The IPCC publishes comprehensive scientific documents known as Assessment Reports, abbreviated as ARs. Produced every few years, these multi-volume reports assess published global climate research, providing detailed scientific analyses of physical climate changes, vulnerability impacts, adaptation capabilities, and greenhouse gas mitigation strategies to inform international climate negotiations and policies.

68. (B) The Nobel Peace Prize
In 2007, the IPCC was awarded the Nobel Peace Prize jointly with former United States Vice President Al Gore. The award recognized their extensive efforts to build, synthesize, and disseminate scientific knowledge about anthropogenic climate change, raising global public awareness and laying foundations for international policy action against climate disruption.

69. (B) Stabilizing greenhouse gas concentrations to prevent dangerous human interference with climate
Adopted at the 1992 Rio Earth Summit, the United Nations Framework Convention on Climate Change aims to stabilize atmospheric greenhouse gas concentrations at a level that prevents dangerous anthropogenic interference with Earth's climate system. The treaty seeks to achieve this stabilization within a timeframe allowing ecosystems to adapt naturally to changing climate conditions.

70. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
The UNFCCC establishes the principle of Common but Differentiated Responsibilities and Respective Capabilities. This framework recognizes that while all nations must contribute to global climate solutions, developed countries hold primary historical responsibility for accumulated greenhouse emissions and possess greater financial resources, justifying their leadership role in mitigation efforts and financial support.

71. (B) Conference of the Parties
Within international treaties like the UNFCCC, COP stands for the Conference of the Parties. Serving as the supreme governing body of the convention, the COP meets annually to review global implementation, evaluate national emission inventories, adopt binding climate decisions, and negotiate progressive international agreements to advance global climate protection goals.

72. (C) Paris
The historic twenty-first Conference of the Parties to the UNFCCC was held in Paris, France, in December 2015. This landmark international summit concluded with the unanimous adoption of the Paris Agreement, establishing a global

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92. (B) National Mission for Enhanced Energy Efficiency
The National Mission for Enhanced Energy Efficiency focuses on accelerating market-based energy conservation across industrial sectors. A key component of this mission is the Perform, Achieve and Trade scheme, which establishes energy consumption reduction targets for energy-intensive industries and enables trading of energy savings certificates to incentivize efficiency improvements.

93. (B) To protect, restore, and enhance India's forest cover through adaptation and mitigation
The National Mission for a Green India aims to protect, restore, and enhance forest cover across India. By combining climate adaptation and mitigation strategies, the mission focuses on increasing tree density on degraded forest lands, expanding non-forest tree cover, and strengthening forest-dependent community livelihoods through sustainable forest management practices.

94. (C) Micro-irrigation, organic farming, and soil health management
The National Mission on Sustainable Agriculture promotes climate-resilient farming practices to enhance food security. It emphasizes soil health management, micro-irrigation systems, organic agriculture, and efficient water management. These targeted interventions improve crop resilience, prevent soil degradation, optimize input usage, and protect agricultural systems against increasing regional climate risks.

95. (A) I and II only
The National Mission for Sustaining the Himalayan Ecosystem and the National Mission on Strategic Knowledge for Climate Change are official core missions under the NAPCC. The Clean Ganga initiative is managed under a separate national program, making statement three incorrect while statements one and two represent official NAPCC missions.

96. (B) 20%
Under the National Action Plan on Climate Change, the National Water Mission aims to ensure integrated water resource management. A principal objective of this mission is to increase water use efficiency by twenty percent through water conservation measures, pricing strategies, recycling initiatives, and modern micro-irrigation practices across urban and agricultural sectors.

97. (B) Nationally Determined Contributions
In UNFCCC terminology, NDC stands for Nationally Determined Contributions. These documents represent official climate action plans submitted by individual countries under the Paris Agreement. NDCs outline national targets and policies for reducing greenhouse gas emissions and adapting to climate impacts, reflecting each nation's domestic capabilities and strategic priorities.

98. (B) 45 percent
In August 2022, India formally updated its Nationally Determined Contributions under the Paris Agreement framework. Among its updated targets, India committed to reducing the greenhouse gas emissions intensity of its gross domestic product by forty-five percent by the year 2030, using 2005 levels as a baseline for measuring economic decarbonization progress.

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99. (C) 50 percent
India's updated Nationally Determined Contributions set a strategic energy goal to achieve fifty percent of cumulative electric power installed capacity from non-fossil fuel energy sources by 2030. This target highlights India's ongoing expansion of solar, wind, hydro, and nuclear power infrastructure to accelerate clean energy transitions nationwide.

100. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
India's updated climate pledges strongly emphasize expanding renewable energy capacity to decarbonize the power sector. By transitioning away from fossil fuel reliance, India aims to reduce its economic emissions intensity while meeting growing national energy demand. Thus, the need for sustainable economic growth directly explains the strategic focus on renewables.

101. (B) LIFE (Lifestyle for Environment)
India incorporated the Lifestyle for Environment movement into its updated Nationally Determined Contribution submission. Launched as a global mass movement, LiFE promotes conscious, mindful resource utilization over mindless consumption. It encourages individuals and communities to adopt eco-friendly daily habits that collectively contribute to environmental sustainability and global climate protection goals.

as carbon dioxide gas, while soil exposure accelerates microbial oxidation, significantly contributing to net anthropogenic greenhouse gas emissions.

122. (B) Curb deforestation and degradation while promoting forest conservation and sustainability
REDD+ is an international climate framework created under the UNFCCC to incentivize developing nations to reduce emissions from deforestation and forest degradation. The program offers financial results-based compensation for conserving standing forests, managing forest ecosystems sustainably, and enhancing forest carbon stocks, turning forest conservation into an economically viable strategy.

123. (C) Afforestation and Reforestation
Afforestation involves establishing new forest cover on land historically devoid of trees, while reforestation replants depleted or clear-cut forest areas. Both forestry practices significantly increase photosynthetic carbon absorption, rapidly build biomass carbon stocks, restore degraded soil ecosystems, and enhance regional biodiversity, serving as highly effective nature-based climate change mitigation solutions.

124. (A) Mitigation reduces greenhouse gas emissions, while adaptation adjusts to climate impacts
Climate change mitigation focuses on actions that reduce greenhouse gas emissions or enhance carbon sinks to limit global warming severity. In contrast, climate adaptation involves modifying human activities, infrastructure, and natural systems to adjust to actual or expected climate impacts, reducing vulnerability and building resilience against changing climatic conditions.

125. (A) I and II only
Constructing sea walls protects coastal communities against flooding, and breeding drought-resistant crops helps agriculture withstand climate stress, both serving as adaptation strategies. Replacing coal plants with solar farms directly mitigates greenhouse gas emissions, making statement three a mitigation measure while statements one and two represent adaptation actions.

126. (C) Electrifying public transport fleets to lower vehicle emissions
Electrifying public transport fleets directly reduces fossil fuel combustion, lowering tailpipe greenhouse gas emissions from urban transportation networks. Because this intervention targets the underlying source of global warming by decreasing atmospheric carbon emissions, it represents a classic climate mitigation strategy, unlike adaptive infrastructure projects designed to manage environmental impacts.

127. (B) Historical emissions make warming unavoidable, requiring concurrent adaptation measures
Historical greenhouse gas emissions have already locked in a degree of global warming and climate change impacts due to atmospheric residence times. While mitigation remains essential to limit future temperature increases, adaptation measures are concurrently required to build resilience against unavoidable current and near-term climate disruptions already occurring across ecosystems.

128. (B) Adaptation actions that unintentionally increase climate vulnerability or emissions
Maladaptation refers to climate adaptation initiatives that produce unintended adverse consequences. It occurs when actions designed to build resilience end up increasing long-term vulnerability, shifting climate risks onto vulnerable populations, or increasing greenhouse gas emissions, such as over-reliance on energy-intensive air conditioning during extreme heat waves.

129. (B) By enhancing soil moisture, moderating microclimates, and diversifying income
Integrating trees into agricultural landscapes provides key climate adaptation benefits. Agroforestry systems improve soil water retention, protect crops from extreme heat by creating favorable microclimates, and protect farmers against crop failures by diversifying income through timber and fruit sales, thereby building rural socioeconomic resilience under shifting climatic conditions.

130. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Expanding urban green spaces is an effective climate strategy because vegetation provides dual ecological benefits. Urban trees sequester carbon dioxide from the air to mitigate warming, while shade and evapotranspiration mitigate localized urban heat island effects. Thus, dual

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wind energy capacity serves as a key strategy for global power sector decarbonization.

112. (B) By replacing fossil fuel power, substantially reducing greenhouse gas emissions
Expanding renewable energy generation directly replaces conventional fossil fuel power plants in national electrical grids. By substituting coal, oil, and gas combustion with clean power sources like solar, wind, and hydro, renewable energy deployment drastically reduces power sector carbon dioxide releases, representing a primary mechanism for global climate change mitigation.

113. (C) France
India jointly launched the International Solar Alliance alongside France during the COP 21 climate summit in Paris in 2015. Headquartered in Gurugram, India, this treaty-based international organization aims to mobilize global investments, reduce technology costs, and promote solar energy deployment across solar-rich countries situated between the Tropics of Cancer and Capricorn.

114. (B) Intermittency, as power generation depends on solar and wind availability
Solar and wind energy generation depend on fluctuating weather conditions and diurnal light cycles, creating power intermittency challenges. To ensure continuous electrical grid stability and reliable energy dispatch during periods without sunlight or wind, developing advanced energy storage systems, such as utility-scale battery technologies, is essential for clean energy integration.

115. (A) I, II, and III only
India targets five hundred gigawatts of non-fossil fuel power capacity by 2030, with solar constituting the primary renewable component. Green hydrogen relies on clean renewable power for electrolysis. Nuclear power is clean but categorized separately from renewables, making statement four false while statements one, two, and three are accurate.

116. (B) Biomass
Biomass energy is derived from organic plant material that absorbed carbon dioxide during its growth cycle. When consumed for energy at rates equal to natural replanting and regeneration, the released carbon dioxide balances the carbon absorbed during growth. Consequently, biomass can operate as a carbon-neutral renewable energy source under sustainable management practices.

117. (B) Trees capturing atmospheric CO_2 and storing it in biomass and soil
Forest carbon sequestration describes the natural process where trees and woody vegetation extract carbon dioxide from the atmosphere through photosynthesis. Plants convert this inorganic carbon into organic compounds, storing it within living trunks, branches, root systems, leaf litter, and surrounding forest soils over extended ecological timeframes, maintaining natural carbon storage pools.

118. (B) Forest soils including organic litter and roots
Globally, forest soils represent the largest carbon pool within forest ecosystems, storing more organic carbon than living aboveground vegetation. Soil carbon pools comprise decomposing organic matter, microbial biomass, fine root networks, and humic substances. Protecting forest soils against disturbance is essential to prevent large-scale carbon releases into Earth's atmosphere.

119. (B) Blue carbon
Blue carbon refers to organic carbon captured and stored within coastal and marine ecosystems, including mangroves, tidal salt marshes, and seagrass meadows. These coastal ecosystems filter sediments and bury carbon within anaerobic soils at high rates per hectare, forming long-term carbon sinks that play a crucial role in global climate mitigation.

120. (A) I, II, III
Tropical peat swamp forests hold exceptional carbon sequestration capacity per hectare due to thick, carbon-rich organic peat layers. Open grasslands maintain moderate soil carbon storage beneath root networks, whereas desert scrub ecosystems store relatively low amounts of organic carbon due to sparse vegetation and low biomass density, establishing the correct descending order.

121. (B) Stored carbon in biomass and soil is released via burning or decay
Deforestation converts forest carbon sinks into carbon sources by halting photosynthetic carbon absorption and exposing accumulated biomass to burning or rapid decay. Cleared trees release stored organic carbon back into the atmosphere

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The Loss and Damage Fund was established at COP 27 to assist vulnerable nations facing severe climate impacts.

141. (C) Incheon, South Korea
The independent Secretariat of the Green Climate Fund is headquartered in Songdo, Incheon, Republic of Korea. Operating from this location, the Secretariat manages daily fund operations, reviews project funding proposals, coordinates international accredited entities, and oversees financial distribution to climate mitigation and adaptation projects in developing nations.

142. (B) A 50:50 balance between mitigation and adaptation over time
The Green Climate Fund mandates a balanced allocation framework across its funding portfolio. It aims to achieve an equal fifty-fifty balance between climate change mitigation and adaptation projects over time, ensuring adequate financial resources are directed toward vulnerable developing countries requiring critical support for climate resilience.

143. (B) Developing nations define their climate priorities and guide fund allocation
Country ownership is a core principle governing Green Climate Fund operations. It mandates that developing countries identify their own specific climate change priorities through National Designated Authorities. This policy ensures that funded adaptation and mitigation projects align directly with national climate strategies, local needs, and sustainable development plans.

144. (B) Using its Private Sector Facility to de-risk investments through concessional finance
The Green Climate Fund mobilizes private sector capital through its dedicated Private Sector Facility. By offering concessional loans, equity investments, guarantees, and co-financing, the fund de-risks private investments in clean energy, sustainable infrastructure, and adaptation technologies across developing markets, encouraging greater private commercial participation in climate initiatives.

145. (A) I, II, and III only
Climate change intensifies atmospheric moisture, prolongs regional droughts, and increases tropical cyclone intensity via warmer sea surface temperatures. However, altered atmospheric polar jet streams can still trigger extreme cold wave outbreaks, rendering statement four scientifically incorrect while statements one, two, and three accurately describe climate impacts.

146. (B) Urban zones having higher temperatures than rural surroundings due to pavement and heat retention
The urban heat island effect describes the phenomenon where urban areas record significantly higher temperatures than surrounding rural landscapes. Dense concentrations of concrete buildings, dark asphalt pavements, industrial activities, and waste heat retention trap solar radiation, exacerbating localized heat stress during global heatwaves driven by climate change.

147. (B) Rapid drought onset driven by high temperatures, low rainfall, and elevated evaporation
A flash drought is characterized by rapid onset and intensification, developing over weeks rather than months. Driven by unusually high temperatures, low precipitation, strong winds, and high atmospheric evapotranspiration demand, flash droughts severely deplete soil moisture rapidly, causing sudden agricultural stress and devastating impacts on regional water resources.

148. (B) Marine heatwaves
Coral bleaching occurs when prolonged marine heatwaves elevate seawater temperatures above critical thermal thresholds. Thermal stress forces reef-building corals to expel their symbiotic photosynthetic zooxanthellae algae, causing corals to turn completely white. Extended exposure to high ocean temperatures leads to widespread coral starvation, disease, and reef mortality.

149. (B) Urban flooding and severe soil erosion
Concentrating heavy seasonal rainfall into fewer intense precipitation days creates severe environmental challenges in Uttar Pradesh. Excessive rainfall overwhelms urban storm drainage infrastructure, causing severe localized flash flooding, while rapid surface runoff strips fertile topsoil from agricultural lands, exacerbating soil erosion and damaging rural infrastructure across the state.

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mitigation and adaptation functionalities fully justify urban greening initiatives.

131. (B) The Directorate of Environment under the UP Environment Department
In Uttar Pradesh, the Directorate of Environment, functioning under the Department of Environment, Forest and Climate Change, serves as the nodal administrative agency responsible for coordinating the State Action Plan on Climate Change. It oversees policy alignment, facilitates inter-departmental cooperation, and monitors climate adaptation and mitigation initiatives statewide.

132. (B) The Bundelkhand region
The Uttar Pradesh State Action Plan on Climate Change identifies the southern Bundelkhand region as exceptionally vulnerable to climate impacts. Characterized by rocky terrain, erratic monsoon rainfall, high evapotranspiration rates, and low groundwater availability, Bundelkhand suffers from frequent severe droughts, water scarcity, land degradation, and agricultural distress.

133. (C) Agriculture and Allied Sectors
Agriculture and allied sectors form the principal focus of climate adaptation strategies in the Uttar Pradesh State Action Plan on Climate Change. Because rural livelihoods and state food security depend heavily on weather patterns, climate adaptation priorities emphasize resilient crop development, efficient irrigation management, soil conservation, and weather forecasting infrastructure.

134. (B) Planting tens of crores of saplings during dedicated annual drives statewide
To combat climate change and expand green cover, Uttar Pradesh undertakes massive annual afforestation drives during Van Mahotsav. These state initiatives mobilize government agencies and public participation to plant tens of crores of saplings annually across riverbanks, degraded forest lands, and farm boundaries, enhancing state carbon sequestration capabilities.

135. (B) Stepwells (Baolis) and village ponds (Talabs)
The Uttar Pradesh State Action Plan on Climate Change prioritizes rejuvenating traditional water harvesting structures, specifically village ponds and historical stepwells. Restoring these decentralized water bodies enhances localized rainwater storage, recharges depleted groundwater tables, reduces runoff, and provides sustainable water supplies for rural communities during extended dry periods.

136. (A) PM-KUSUM Scheme
The PM-KUSUM scheme supports climate mitigation in Uttar Pradesh by promoting energy-efficient, solar-powered agricultural pumps. Replacing conventional diesel and grid-connected electric pumps with solar pumping systems reduces agricultural fossil fuel consumption, lowers carbon emissions, enhances farmer income, and ensures reliable daytime irrigation access for rural farming communities.

137. (B) It replaces fossil fuels with renewable biofuel, lowering greenhouse emissions
Promoting ethanol blending in petrol using sugarcane molasses supports climate protection by substituting non-renewable fossil fuels with renewable biofuels. Biogenic carbon released during ethanol combustion is balanced by atmospheric carbon absorbed by growing sugarcane crops, substantially lowering life-cycle tailpipe greenhouse gas emissions and reducing national petroleum import dependencies.

138. (B) A UNFCCC financial mechanism supporting developing nations in adaptation and mitigation
The Green Climate Fund functions as an official financial mechanism operating under the United Nations Framework Convention on Climate Change. It was established to assist developing nations in responding to climate change by allocating financial resources to fund high-impact climate adaptation projects and greenhouse gas mitigation initiatives globally.

139. (C) 2010
The Green Climate Fund was formally established by 194 participating nations during the COP 16 climate conference held in Cancun, Mexico, in 2010. Designated as an operating entity of the UNFCCC financial mechanism, it was created to mobilize climate finance at scale to support sustainable development in developing countries.

140. (A) P-3, Q-4, R-1, S-2
The Green Climate Fund operates under the UNFCCC from Incheon. The Global Environment Facility serves multiple environmental conventions. The Adaptation Fund finances adaptation initiatives under the Kyoto Protocol.

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82. (C) 2005
The Kyoto Protocol was officially adopted in 1997 but required ratification by fifty-five parties accounting for fifty-five percent of Annex I 1990 emissions to take legal effect. Following ratification by the Russian Federation, this treaty requirement was formally satisfied, allowing the Kyoto Protocol to officially enter into force in February 2005.

83. (A) Annex I
Under the UNFCCC and Kyoto Protocol frameworks, industrialized countries and economies in transition were formally designated as Annex I parties. Grounded in historical responsibility for carbon emissions, Annex I nations accepted specific commitments, including binding emission reduction targets during the Kyoto Protocol's first commitment period to mitigate global greenhouse gas releases.

84. (D) The Green Climate Fund Guarantee
The Kyoto Protocol established three flexible market-based mechanisms: the Clean Development Mechanism, Joint Implementation, and International Emissions Trading. These mechanisms allowed developed nations to fulfill emission targets cost-effectively. The Green Climate Fund is an independent financial mechanism created under later UNFCCC negotiations rather than a Kyoto flexible market mechanism.

85. (A) I, II, and IV only
The Kyoto Protocol faced major challenges because the United States never ratified it, large emerging economies had no binding targets, and Canada withdrew in 2011. Global greenhouse emissions continued rising throughout this period, rendering statement three incorrect while statements one, two, and four correctly highlight key treaty limitations.

86. (B) One tonne of carbon dioxide
Under the Kyoto Protocol's Clean Development Mechanism, certified emission reduction credits are awarded to projects implemented in developing nations. One certified credit officially represents the verified reduction, removal, or avoidance of one metric tonne of carbon dioxide equivalent emissions, serving as a tradable financial asset in global carbon markets.

87. (C) 2008 to 2012
The first commitment period of the Kyoto Protocol formally commenced in 2008 and concluded in 2012. During these five years, participating Annex I developed countries were legally bound to achieve specific, individual greenhouse gas emission reduction targets relative to their established 1990 baseline levels under international monitoring protocols.

88. (B) Establish the second commitment period of the Kyoto Protocol from 2013 to 2020
The Doha Amendment was formally adopted in 2012 to establish the second commitment period of the Kyoto Protocol, running from 2013 through 2020. It introduced revised emission reduction targets for participating developed parties and expanded the list of targeted greenhouse gases to include nitrogen trifluoride within carbon accounting protocols.

89. (B) 2008
India launched its National Action Plan on Climate Change in June 2008. Designed to promote sustainable development while addressing climate challenges, this national policy framework outlined multi-sectoral strategies to enhance climate adaptation capabilities, accelerate clean energy adoption, and promote ecological sustainability across key sectors of the domestic economy.

90. (A) IV, III, II, I
The IPCC was established in 1988, followed by the adoption of the Kyoto Protocol in 1997. India launched its National Action Plan on Climate Change in 2008, and the Paris Agreement was formally adopted in 2015. This progression represents the correct chronological sequence of international and domestic climate developments.

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91. (C) 8
India's National Action Plan on Climate Change is structured around eight national core missions. These specialized missions address key environmental sectors, including solar energy, energy efficiency, sustainable habitat, water resources, Himalayan ecosystems, forest conservation, sustainable agriculture, and strategic knowledge, providing a comprehensive national climate policy response across various industries.

150. (A) I, III, II, IV
Higher temperatures and early snowmelt dry out forest vegetation, creating abundant fuel. Prolonged dry weather further desiccates forest fuel loads. Subsequent ignition by lightning or human activity initiates burning, leading to the rapid spread of severe, hard-to-control wildfires. This represents the logical causal sequence of wildfire escalation.

151. (B) Heat dome
A heat dome describes an atmospheric phenomenon where a strong, slow-moving high-pressure ridge traps warm ocean air over a geographic region. The high pressure acts like a lid, compressing and heating descending air while pushing clouds away, causing persistent, extreme heatwave conditions and record high temperatures for extended periods.

152. (B) A person displaced from home by environmental changes threatening survival or livelihood
A climate refugee is an individual forced to leave their home or community due to sudden or gradual environmental disruptions linked to climate change. Drivers such as rising sea levels, severe droughts, desertification, and extreme weather events compromise local livelihoods, food security, and habitability, forcing population displacement.

153. (B) No, the 1951 Convention strictly applies to persecution based on race, religion, or political grounds
Current international legal frameworks, specifically the 1951 UN Refugee Convention, do not formally recognize environmental displacement or climate refugees. The convention restricts legal refugee status to individuals fleeing persecution based on race, religion, nationality, political opinion, or social membership, leaving climate-displaced individuals without standardized protection under refugee law.

154. (B) Sea-level rise and saltwater intrusion
Low-lying Small Island Developing States like Kiribati and Tuvalu face severe displacement threats primarily from sea-level rise and coastal flooding. Elevating sea levels cause coastal land erosion, submerge low islands, and drive saltwater intrusion into fragile freshwater aquifers, destroying agricultural soils and drinking water supplies, forcing community relocation.

155. (B) Tensions over scarce resources like land, water, and food where displaced populations settle
Resource conflicts occur when climate displacement forces populations to migrate into host regions where vital natural resources are already scarce. Increased competition over land, water, housing, and food between displaced migrants and resident communities can heighten local social tensions, potentially triggering economic strain and violent regional conflicts.

156. (B) Proactively relocating communities from vulnerable areas before disaster strikes
Planned relocation refers to a structured, proactive strategy where communities located in high-risk, climate-vulnerable zones are systematically assisted to move and resettle in safer geographic locations before catastrophic disasters occur. This planned adaptation process aims to protect human lives, restore livelihoods, and provide durable infrastructure for displaced populations.

157. (A) The IPCC Sixth Assessment Report (AR6)
The IPCC Sixth Assessment Report provides the most comprehensive scientific evaluation of global climate change. It conclusively establishes that human influence has unequivocally warmed Earth's atmosphere, oceans, and land surface, driving widespread shifts in extreme weather, atmospheric composition, ice coverage, and global sea level rise across every world region.

158. (B) Difference between planned emissions under pledges and levels needed to limit warming to 1.5°C
The emissions gap evaluates the disparity between projected global greenhouse gas emissions under current national climate pledges and the significantly lower emission levels required to limit global warming to 1.5 degrees Celsius. Published by UNEP, this report highlights the urgent need for enhanced international climate ambition and mitigation targets.

159. (A) World Meteorological Organization (WMO)
The annual State of the Global Climate report is published by the World Meteorological Organization. It provides authoritative global monitoring of key climate indicators, including atmospheric greenhouse gas concentrations, ocean heat content, ocean acidification, sea-level rise, glacial melt rates, and extreme weather

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CHAPTER 06
Soil and Moisture Conservation

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1. The geological process of soil formation, which involves the weathering of rocks and the accumulation of organic matter over time, is scientifically termed as:
(A) Morphogenesis
(B) Pedogenesis
(C) Lithification
(D) Podzolization

2. Which soil horizon is primarily composed of unweathered or partially weathered bedrock, representing the parent material of the soil profile?
(A) O Horizon
(B) A Horizon
(C) R Horizon
(D) C Horizon

3. In the fundamental equation of soil formation, the independent variables determining soil properties are climate, organisms, relief, parent material, and:
(A) Time
(B) Temperature
(C) Topography
(D) Tectonic activity

4. The downward transport of suspended or dissolved minerals and organic matter through the soil profile by the movement of water is known as:
(A) Illuviation
(B) Salinization
(C) Eluviation
(D) Calcification

5. Biological weathering in the process of soil formation is most significantly accelerated by which of the following?
(A) The release of chelating organic acids by lichens and plant roots
(B) Frost wedging in high-altitude regions
(C) The expansion and contraction of rocks due to diurnal temperature changes
(D) The abrasive action of wind-borne sand particles

6. Humus, a dark, organic material that forms in soil when plant and animal matter decays, contributes to soil health primarily by:
(A) Decreasing the overall water-holding capacity and infiltration
(B) Increasing soil bulk density while significantly reducing aeration
(C) Lowering the overall porosity and percolation rate of topsoil
(D) Improving soil structure and cation exchange capacity

7. According to the Indian Council of Agricultural Research (ICAR) classification, which soil type occupies the largest geographical area in India?
(A) Red Soil
(B) Alluvial Soil
(C) Black Soil
(D) Laterite Soil

8. In the context of alluvial soils in the Indo-Gangetic plains, what distinguishes 'Bangar' from 'Khadar'?
(A) Bangar represents young, highly fertile flood alluvium, whereas Khadar denotes older high-land alluvium.
(B) Bangar is confined exclusively to deltaic coastal plains, whereas Khadar occurs along active river valleys.
(C) Bangar represents older, less fertile alluvium containing calcareous kankar nodules.
(D) Bangar is characterized by low-lying floodplains that experience annual river inundation.

9. The self-ploughing characteristic of black soils (Regur) in the Deccan plateau is primarily due to the high presence of which clay mineral?
(A) Kaolinite
(B) Illite
(C) Chlorite
(D) Montmorillonite

10. Given below are two lists. Match List I with List II:
List I: (Soil Type)

169. (A) Promoting mindful resource utilization over destructive consumption
The LiFE (Lifestyle for Environment) movement introduced by India emphasizes shifting global consumption habits from mindless, destructive resource exploitation toward deliberate, mindful utilization. It encourages individual action and community behaviors, promoting energy conservation, sustainable diets, waste reduction, and circular economy practices to address global climate change and environmental degradation.

170. (B) Holding school debate and painting contests on conservation and climate topics
State forest departments, including Uttar Pradesh, organize educational awareness campaigns during Wildlife Week. By holding painting competitions, essay writing contests, and school debates on environmental themes, forest authorities engage youth, raise public consciousness about biodiversity preservation, and build community support for wildlife protection and climate conservation efforts.

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56. The spread of desert-like conditions along the margins of the Aravalli range in north-western India is primarily exacerbated by:
(A) High-altitude glacial activity and freeze-thaw cycles across mountain summits
(B) Substantial long-term increases in annual rainfall volume across the region
(C) Deforestation and mining in hills removing the natural barrier to Thar desert
(D) Uncontrolled population growth and territorial expansion of wild desert foxes

57. Which biological technique is most effective for the stabilization of shifting sand dunes in desertified areas?
(A) Periodically flooding mobile sand dunes with high-salinity seawater from coastal bays
(B) Continuous mechanical ploughing of shifting dune surfaces using heavy tractor units
(C) Fully covering expansive sand dune surfaces with impermeable black plastic sheeting
(D) Establishing grid plantings of drought-resistant trees and xerophytic shrubs

58. The phenomenon where prolonged drought and poor land management strip the soil of its vegetation, increasing surface albedo and further suppressing local rainfall, is an example of:
(A) A positive feedback loop accelerating desertification
(B) A negative feedback loop in climate ecology
(C) The greenhouse gas effect
(D) El Nino Southern Oscillation

59. In soil moisture terminology, the water held in the soil micropores against the pull of gravity and readily available for plant root absorption is called:
(A) Gravitational water
(B) Capillary water
(C) Hygroscopic water
(D) Runoff water

60. Consider the following agronomic practices:
I. Application of organic mulch
II. Conservation tillage (Zero tillage)
III. Intensive deep ploughing during summer
Which of the above practices help in reducing evaporative loss of moisture from the soil surface?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

61. 'Field Capacity' of a soil refers to the amount of soil moisture or water content held in the soil after:
(A) Free gravitational water drains and downward movement slows significantly
(B) Plant roots have permanently wilted due to severe soil moisture suction limits
(C) Soil samples have been completely oven-dried at elevated temperatures of 105°C
(D) The entire field surface becomes fully inundated under deep standing floodwaters

62. When soil moisture drops to a critical level where plant roots can no longer extract water against the matric potential of the soil, the soil is said to have reached its:
(A) Liquid Limit
(B) Plastic Limit
(C) Wilting Point (Permanent Wilting Point)
(D) Saturation Point

63. Soil mulching conserves soil moisture primarily by:
(A) Significantly accelerating wind speeds directly across the exposed field surface
(B) Compacted soil aggregates to block all natural rainwater infiltration pathways
(C) Actively absorbing moisture vapor from ambient night air into the topsoil layer
(D) Forming a physical barrier that reduces solar radiation and wind action on soil

64. The addition of organic matter (like compost) improves the moisture conservation capacity of sandy soils primarily because organic matter:
(A) Shifts soil pH rapidly toward highly alkaline conditions unsuitable for crops
(B) Accelerates immediate downward drainage of all available soil capillary water
(C) Increases soil water-holding capacity and improves aggregate stability
(D) Coats individual sand particles with a highly water-repellent wax layer

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65. Consider the following statements regarding the characteristics of wetlands as recognized by the Ramsar Convention:
I. They can be natural or artificial, permanent or temporary.
II. Their water can be static or flowing, fresh, brackish, or salt.
III. They include marine water areas where depth at low tide does not exceed six metres.
IV. They exclusively represent high-altitude

P. Laterite Soil
Q. Black Soil
R. Peaty Soil
S. Red Soil

List II: (Characteristic)

1. High iron content, forms due to intense leaching
2. Derived from weathering of ancient crystalline and metamorphic rocks
3. High moisture retention, ideal for cotton
4. Highly acidic, formed in areas of heavy rainfall and high humidity

(A) P-1, Q-3, R-4, S-2
(B) P-1, Q-2, R-4, S-3
(C) P-4, Q-3, R-1, S-2
(D) P-2, Q-3, R-4, S-1

11. Laterite soils in India are generally unsuitable for agriculture without heavy manuring because they are heavily leached of:
(A) Iron and Aluminum
(B) Silica and Lime
(C) Sodium and Potassium
(D) Magnesium and Manganese

12. The characteristic red colour of red soils is fundamentally attributed to:
(A) High accumulation of organic humus and organic debris in topsoil
(B) Diffusion of iron in crystalline and metamorphic rocks
(C) Presence of unweathered basaltic parent rock material throughout
(D) Accumulation of insoluble calcium carbonate deposits in topsoil

13. Which of the following amendments is most commonly recommended for the reclamation of highly alkaline (Usar) soils in Uttar Pradesh?
(A) Application of Gypsum
(B) Addition of Agricultural Lime
(C) Excessive use of Urea
(D) Spraying of Potassium Chloride

14. Soil erosion refers to the detachment and transport of soil particles. Which of the following defines 'geologic erosion'?
(A) Accelerated soil loss caused directly by improper tillage and agricultural practices
(B) Rapid topsoil degradation due to large-scale surface mining and industrial activities
(C) Natural erosion occurring without human interference
(D) Wind-driven sediment transport restricted exclusively to arid desert margins

15. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): Deforestation in the Himalayan region has severely increased the incidence of soil erosion and landslides.
Reason (R): The intricate root systems of trees bind the soil aggregates together and regulate surface runoff.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

16. Among the anthropogenic causes of soil erosion, 'shifting cultivation' (Jhumming) is most prevalent and damaging in which region of India?
(A) Western Ghats
(B) Arid regions of Rajasthan
(C) North-Eastern States
(D) Coastal plains of Odisha

17. How does chronic overgrazing by livestock primarily contribute to accelerated soil erosion?
(A) By significantly increasing the accumulation of organic waste and soil nitrogen
(B) By compacting soil and removing plant cover, reducing water infiltration
(C) By naturally forming terraced pathways along hillsides through livestock movement
(D) By stimulating the extensive growth of deep-rooted, drought-resistant grasses

18. Open-cast mining activities exacerbate soil erosion predominantly by:
(A) Altering localized rainfall patterns through atmospheric micro-climate modifications
(B) Rapidly elevating the underground water table directly to the surface terrain
(C) Accelerating the natural rate of subsoil pedogenesis across exposed rock surfaces
(D) Removing overburden and stripping the protective topsoil and plant cover

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19. The removal of a uniform thin layer of topsoil by the action of surface runoff, often unnoticed by farmers until productivity drops, is known as:
(A) Sheet erosion
(B) Splash erosion
(C) Rill erosion

(D) Gully erosion

20. Consider the following factors regarding soil erosion:
I. High intensity of rainfall
II. Dense vegetative canopy
III. Steep topographic slope
Which of the above factors act as natural drivers that accelerate water erosion of soil?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

21. Which of the following correctly identifies the progressive stages of water erosion in order of increasing severity?
(A) Rill erosion, Sheet erosion, Splash erosion, Gully erosion
(B) Splash erosion, Sheet erosion, Rill erosion, Gully erosion
(C) Sheet erosion, Rill erosion, Gully erosion, Splash erosion
(D) Splash erosion, Gully erosion, Sheet erosion, Rill erosion

22. In the context of wind erosion, the process where medium-sized soil particles (0.1 to 0.5 mm) bounce and hop along the surface is known as:
(A) Surface Creep
(B) Suspension
(C) Deflation
(D) Saltation

23. The extensive network of ravines found in the Chambal valley is a classic geographic example of advanced:
(A) Sheet erosion
(B) Gully erosion
(C) Wind deflation
(D) Glacial erosion

24. Which type of erosion is primarily initiated by the kinetic energy of falling raindrops striking bare soil?
(A) Slip erosion
(B) Streambank erosion
(C) Splash erosion
(D) Coastal erosion

25. Consider the following statements regarding soil particle movement during wind erosion:
I. Suspension involves very fine particles ($<$ 0.1 mm) carried high in the air.
II. Saltation accounts for the majority (50-70%) of soil movement by wind.
III. Surface creep involves large particles rolling along the ground.
IV. Wind erosion is most severe in heavily forested, humid regions.
Which of the statement(s) given above is/are correct?
(A) I, II, and III only
(B) I, III, and IV only
(C) II, III, and IV only
(D) I, II, III, and IV

26. Which of the following features makes loamy soils generally more resistant to wind erosion compared to fine sandy soils?
(A) They have stronger soil aggregation due to clay and humus content.
(B) They display significantly reduced water retention capacity across all soil horizons.
(C) They completely lack organic matter and colloidal particles in their matrix.
(D) They consist of coarse, non-cohesive solitary mineral grains allowing wind passage.

27. The phenomenon of coastal erosion in India is most aggressively driven by:
(A) Continuous saltation and surface creep processes along Sandy beach dunes
(B) Tidal waves, storm surges, and longshore currents
(C) Intensive over-irrigation practices on low-lying coastal agricultural fields
(D) Widespread afforestation programs using native mangrove vegetation along shores

28. Why is the conservation of topsoil considered critically urgent from an agricultural perspective?
(A) Topsoil contains minimal nutrients and organic carbon necessary for plant root growth.
(B) Its formation takes centuries, making it non-renewable on a human timescale.
(C) Topsoil acts as an impermeable layer that severely hinders groundwater percolation.
(D) Topsoil consists primarily of unweathered parent bedrock needed for infrastructure.

29. Severe soil erosion directly negatively impacts agricultural productivity by:
(A) Removing fine, nutrient-rich soil particles and organic matter
(B) Substantially expanding the total water-holding capacity and pore space of soil
(C) Greatly stimulating the natural population

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and activity of beneficial earthworms
(D) Deepening the overall thickness of the aerated root zone across the profile

30. Consider the following impacts of unchecked soil erosion on a river ecosystem:
1. Increase in sediment load of the river
2. Siltation of the riverbed
3. Reduction in the river's carrying capacity
4. Increased frequency and severity of floods

Which of the following represents the correct sequential order of these impacts?
(A) 1, 2, 3, 4
(B) 2, 1, 4, 3
(C) 1, 3, 2, 4
(D) 3, 1, 2, 4

31. Which of the following best describes 'in-situ' soil moisture conservation?
(A) Excavating topsoil and transferring it to climate-controlled artificial greenhouses
(B) Constructing massive concrete storage dams far away from agricultural watersheds
(C) Drilling deep borewells to extract sub-surface groundwater for continuous irrigation
(D) Applying mulching and contour tillage to retain rainfall directly where it falls

32. In the context of national food security, unchecked soil degradation threatens to:
(A) Drastically lowering international market prices for all major staple food crops
(B) Significantly boosting the per-hectare productivity of indigenous crop varieties
(C) Shrinking arable land and reducing crop yields, leading to food insecurity
(D) Forcing a complete transition to high-tech indoor hydroponic farming nationwide

33. The 'Universal Soil Loss Equation' (USLE) is a mathematical model used by conservationists primarily to:
(A) Accurately predict the exact date and location where a landslide event will occur
(B) Estimate long-term soil loss from sheet and rill erosion on specific land areas
(C) Calculate the optimal quantity of synthetic chemical fertilizers needed per hectare
(D) Measure the precise moisture content and water potential within deep subsoil layers

34. Contour bunding is a mechanical method of soil conservation best suited for areas having:
(A) Very steep slopes (above 30%) and high rainfall
(B) Flat terrain with severe wind erosion
(C) Coastal sandy beaches facing tidal waves
(D) Slopes up to 6% and low to medium rainfall

35. Consider the following steps involved in the construction of bench terraces:
I. Excavation of earth from the upper half of the terrace
II. Detailed topographical survey and alignment of contours
III. Deposition and compaction of earth on the lower half to form a flat bed
IV. Provision of a safe drainage outlet or drop structure

Which of the following represents the correct chronological sequence of these steps?
(A) I, II, III, IV
(B) II, I, III, IV
(C) II, III, I, IV
(D) I, III, II, IV

36. In mechanical soil conservation, what is the primary purpose of constructing 'check dams' across gullies?
(A) To generate continuous hydroelectric power for neighboring rural villages
(B) To permanently reroute the natural stream course into an adjacent watershed
(C) To slow runoff velocity and trap eroded sediment
(D) To establish deep open-water storage reservoirs suitable for commercial aquaculture

37. Broad Bed and Furrow (BBF) systems are engineering structures primarily used for moisture conservation and safe disposal of runoff in which type of soils?
(A) Black cotton soils (Vertisols) with poor drainage
(B) Sandy soils of arid regions
(C) Peaty soils of wetlands
(D) Lateritic soils of high altitudes

38. Contour trenching is widely utilized in afforestation programs in degraded hilly areas primarily because it:
(A) Adds significant aesthetic and recreational value to barren mountain landscapes
(B) Forms an impenetrable physical boundary wall against wild herbivorous animals
(C) Enables smooth movement and operation of heavy mechanical farming machinery

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(D) Retains runoff and conserves moisture to aid sapling growth

39. Gabion structures, used extensively in soil and water conservation, are essentially:
(A) Earthen embankment mounds constructed continuously along natural slope contours
(B) Stone-filled wire baskets forming permeable retaining structures
(C) Deep drainage channels fully lined with continuous waterproof synthetic sheeting
(D) Buried perforated pipe systems designed specifically for subsurface field drainage

40. Given below are two lists. Match List I with List II**:**
List I: (Soil Conservation Measure)
P. Shelterbelts
Q. Strip Cropping
R. Cover Cropping
S. Grassed Waterways
List II: (Description)
1. Growing erosion-resisting crops and erosion-permitting crops in alternate bands
2. Natural drainage channels vegetated with soil-binding grasses
3. Planting dense rows of trees perpendicular to the prevailing wind direction
4. Growing dense vegetation during fallow periods to protect bare soil
(A) P-3, Q-1, R-4, S-2
(B) P-3, Q-4, R-1, S-2
(C) P-1, Q-3, R-2, S-4
(D) P-2, Q-1, R-4, S-3

41. Strip cropping reduces soil erosion predominantly by:
(A) Chemically binding individual soil aggregates together using specialized root exudates
(B) Accelerating surface runoff flow deliberately within designated alternate crop bands
(C) Completely preventing falling rainwater drops from reaching the underlying soil surface
(D) Creating barriers of close-growing crops that slow runoff from adjacent strips

42. Afforestation plays a vital role in biological soil conservation. How does the tree canopy specifically reduce soil erosion?
(A) By intercepting raindrops and reducing their kinetic energy before impact
(B) By completely blocking all air movement and wind currents across the forest landscape
(C) By elevating topsoil temperatures significantly to bake surface aggregates solid
(D) By extracting excessive trace minerals and heavy salts from the underlying subsoil

43. Agrostology, which has significant applications in biological soil conservation, is the scientific study of:
(A) Forest canopy structures
(B) Grasses
(C) Soil microbiology
(D) Earthworm cultivation

44. Which of the following plants is most commonly recommended as a deep-rooted grass species for stabilizing bunds and gullies in India?
(A) Water Hyacinth
(B) Vetiver (Khus)
(C) Parthenium
(D) Blue-green algae

45. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): The cultivation of leguminous cover crops is highly beneficial for soil conservation and fertility.
Reason (R): Legumes possess a deep taproot system that prevents wind erosion and fixes atmospheric nitrogen through symbiotic bacteria.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

46. In the context of soil nutrient management, which of the following elements are classified as primary macronutrients essential for plant growth?
(A) Iron, Zinc, Manganese
(B) Calcium, Magnesium, Sulphur
(C) Nitrogen, Phosphorus, Potassium
(D) Copper, Boron, Molybdenum

47. Which secondary macronutrient plays a critical structural role in the middle lamella of plant cell walls and helps in regulating soil pH?
(A) Sulphur
(B) Magnesium
(C) Zinc
(D) Calcium

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48. Biofertilizers are living microorganisms applied to soil or seeds. Which biofertilizer is typically used for nitrogen fixation in paddy (rice) fields?
(A) Rhizobium
(B) Mycorrhizae
(C) Azolla-Anabaena symbiotic complex
(D) Trichoderma

49. Green manuring involves:
(A) Directly spreading raw, uncomposted animal manure and farm waste across the field surface
(B) Incorporating green leguminous crops into the soil
(C) Applying green protective paint along woody tree trunks to deter wood-boring insect pests
(D) Applying synthetic liquid chemical fertilizers manufactured from aquatic green algae extracts

50. Given below are two lists. Match List I with List II**:**
List I: (Essential Plant Nutrient)
P. Nitrogen
Q. Phosphorus
R. Potassium
S. Iron
List II: (Primary Deficiency Symptom)
1. Interveinal chlorosis appearing first on younger leaves
2. Overall yellowing (chlorosis) of older leaves first
3. Dark green leaves often showing purple pigmentation
4. Burning or scorching of leaf margins (edges)
(A) P-2, Q-3, R-4, S-1
(B) P-3, Q-2, R-1, S-4
(C) P-1, Q-4, R-3, S-2
(D) P-2, Q-4, R-3, S-1

51. The Cation Exchange Capacity (CEC) of a soil is a crucial indicator of its fertility. A soil with a high CEC generally signifies:
(A) High clay and organic content with strong nutrient retention
(B) Dominant coarse sand fraction resulting in rapid leaching and poor retention
(C) Excessive accumulation of soluble salts making the land unfit for cultivation
(D) Total absence of active biological organisms and microfauna within the profile

52. Integrated Nutrient Management (INM) refers to:
(A) Relying exclusively on imported synthetic chemical fertilizers to maximize crop yields
(B) Completely substituting all synthetic fertilizers with low-nutrient organic manures
(C) Combining chemical, organic, and biological nutrient sources balancedly
(D) Applying nutrient supplements strictly during the final crop harvesting phase

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53. According to the United Nations Convention to Combat Desertification (UNCCD), 'desertification' is precisely defined as:
(A) Land degradation in drylands caused by climate variations and human activities
(B) The natural geographical expansion of hyper-arid desert biomes due to tectonic movement
(C) The rapid conversion of humid tropical rainforest ecosystems into open woody savannas
(D) The seasonal drying out of inland freshwater wetlands during periods of severe drought

54. Which anthropogenic activity is recognized as the leading driver of land degradation and desertification in India?
(A) Construction and expansion of high-speed railway transport networks
(B) Large-scale deployment of photovoltaic solar parks in rural wastelands
(C) Extensive implementation of community watershed management projects
(D) Overgrazing and unsustainable agricultural practices

55. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): Intensive canal irrigation in arid and semi-arid regions can ultimately lead to desertification.
Reason (R): Over-irrigation without adequate drainage raises the water table, causing waterlogging and subsequent salinization of the topsoil.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

trends recorded across global monitoring networks.

160. (B) India State of Forest Report (ISFR)
The India State of Forest Report is a comprehensive biennial document published by the Forest Survey of India. It provides detailed satellite-based evaluations of forest and tree cover, growing stock, and canopy density across Indian states, serving as the official benchmark for estimating national forest carbon sinks and monitoring conservation trends.

161. (B) Threshold where a climate system reorganizes abruptly or irreversibly
In climate science, a tipping point represents a critical environmental threshold beyond which a subsystem of Earth's climate reorganizes abruptly or irreversibly. Crossing a tipping point can trigger self-sustaining feedback loops and catastrophic impacts, such as ice sheet collapse or Amazon rainforest dieback, causing major global environmental shifts.

162. (A) Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPBES stands for the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. Functioning as an independent intergovernmental body, IPBES synthesizes global scientific research regarding biodiversity conservation, ecosystem health, species extinction risks, and the compounding impacts of climate change to provide objective policy-relevant assessments for decision-makers worldwide.

163. (B) Accelerating research and investment to make clean energy affordable and accessible
Mission Innovation is a global clean energy initiative aimed at accelerating public and private research, development, and investment. By fostering international collaboration among governments, scientists, and industry leaders, the platform seeks to make clean energy technologies performance-competitive, widely affordable, and globally accessible to accelerate transition toward net-zero emissions.

164. (B) Floating solar power plants on reservoirs and lakes
Under the National Solar Mission, India promotes floating solar photovoltaic systems on water bodies like reservoirs and lakes to overcome land availability constraints. Installing solar arrays on water surfaces conserves agricultural land, reduces water evaporation loss from reservoirs, and enhances solar panel efficiency due to natural water cooling effects.

165. (C) Rooftop solar power systems for households
The PM Surya Ghar: Muft Bijli Yojana is a government initiative launched to accelerate rooftop solar adoption across residential households in India. Providing capital subsidies and grid connectivity, the scheme empowers domestic electricity consumers to generate clean solar power, lower household utility costs, and reduce national grid emissions.

166. (B) A designated development zone offering solar projects plug-and-play infrastructure
In Indian clean energy policy, a Solar Park is a concentrated, contiguous land area developed with centralized plug-and-play infrastructure, including land rights, grid transmission connections, water supply, and access roads. This policy framework minimizes project development risks and speeds up utility-scale solar project construction by private solar developers.

167. (B) It empowers citizens to make informed climate choices and support policies
Climate literacy equips individuals with a foundational scientific understanding of climate mechanisms and human environmental impacts. Enhancing climate literacy empowers citizens to make eco-friendly consumer choices, support sustainable community initiatives, advocate for evidence-based government policies, and build localized community resilience against climate risks and environmental hazards.

168. (B) Ministry of Environment, Forest and Climate Change
The Ministry of Environment, Forest and Climate Change administers the National Green Corps programme across India. Commonly known as Eco-Clubs, this nationwide educational initiative engages school students in environmental protection, tree planting, waste management, and climate awareness activities, fostering environmental stewardship and climate literacy among young citizens.

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glacial lakes devoid of vegetation.

Which of the statement(s) given above is/are correct?

(A) I, II, and III only
(B) I, III, and IV only
(C) II, III, and IV only
(D) I, II, III, and IV

66. Peatlands are a specific type of wetland that are globally significant for soil health and climate regulation because they:

(A) Serve as the main global industrial source of refined commercial sea salt
(B) Possess coarse substrate soils completely lacking water retention capacity
(C) Continuously emit synthetic chlorofluorocarbon compounds into the atmosphere
(D) Store large carbon amounts in undecayed organic matter

67. The 'Montreux Record' is a register of wetland sites on the List of Wetlands of International Importance where:

(A) Ecological character has changed or may change due to human activities
(B) No human presence, settlement, or activity has ever been recorded historically
(C) Migratory bird species from Arctic tundra habitats arrive during winter months
(D) Subsurface soil profiles consist exclusively of recent volcanic ash deposits

68. Uttar Pradesh boasts a significant number of Ramsar sites. Which of the following is a designated Ramsar wetland located in Uttar Pradesh, known for maintaining regional soil moisture and groundwater tables?

(A) Chilika Lake
(B) Keoladeo National Park
(C) Bakhira Wildlife Sanctuary
(D) Loktak Lake

69. Wetlands are often colloquially referred to as the "kidneys of the landscape" because they:

(A) Filter pollutants, retain nutrients, and trap surface water sediments
(B) Synthesize and release functional red blood cells for aquatic fauna species
(C) Continuously pump deep groundwater reserves directly into the lower atmosphere
(D) Feature a distinct, geographically defined kidney bean shape across landscapes

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70. Soils that form under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part are technically termed:

(A) Aridisols
(B) Oxisols
(C) Andisols
(D) Hydric soils

71. The destruction of natural wetlands for urban development typically leads to which consequence regarding soil moisture and hydrology?

(A) Substantially enhances deep percolation into underlying groundwater aquifers
(B) Increased local flooding and reduced groundwater recharge
(C) Sustains a permanent increase in dry-season base flow across regional rivers
(D) Noticeably improves the overall structural stability of topsoil aggregates

72. Percolation tanks are engineered water conservation structures constructed primarily to:

(A) Generate clean, localized hydroelectric power for neighboring communities
(B) Store urban drinking water for transport via high-pressure pipelines
(C) Retain surface runoff to promote infiltration into the aquifer
(D) Evaporate industrial wastewater effluents safely under solar exposure

73. In agricultural water management, a 'Jalkund' refers to:

(A) A massive multi-purpose river valley dam project designed for regional power
(B) A deep industrial borewell equipped with high-capacity electric pumpsets
(C) A traditional brick-lined canal irrigation network built during Mughal times
(D) A low-cost micro-pond lined with plastic for rainwater harvesting

74. Subsurface dams (or groundwater dams) are constructed underground across a stream to:

(A) Intercept and store subsurface aquifer flow for dry-season use
(B) Completely block and prevent all surface flow along major river channels
(C) Prevent migratory sea fish species from traveling upstream during monsoon
(D) Safely divert high-temperature geothermal water springs to the surface

(B) The Food and Agriculture Organization (FAO)
(C) The European Environment Agency (EEA)
(D) The Russian Academy of Sciences

132. Which of the following is a primary mandate of the NBSS&LUP?
(A) Manufacturing and distributing chemical fertilizers directly to farm markets
(B) Setting and enforcing baseline market procurement prices for key farm crops
(C) Conducting soil surveys, mapping soil resources, and planning land use
(D) Enforcing anti-poaching and forest conservation laws across federal reserves

133. When classifying land capability for conservation planning, lands falling under 'Class I to Class IV' are generally considered:
(A) Arable lands fit for cultivation with suitable conservation measures
(B) Non-arable lands restricted strictly to wild fauna conservation and parks
(C) Completely rocky terrain requiring heavy explosive blasting for development
(D) Lands restricted exclusively to permanent timber forestry or livestock grazing

134. Which component of the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) specifically focuses on soil and water conservation works like ridge area treatment, drainage line treatment, and rainwater harvesting?
(A) Accelerated Irrigation Benefit Programme (AIBP)
(B) Har Khet Ko Pani (HKKP)
(C) Per Drop More Crop (PDMC)
(D) Watershed Development Component (WDC)

135. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): The National Mission for Sustainable Agriculture (NMSA) promotes integrated farming systems and soil health management.
Reason (R): Enhancing soil organic carbon and improving water use efficiency are critical for making Indian agriculture resilient to climate change.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

136. The 'Atal Bhujal Yojana' is a central sector scheme heavily focused on:
(A) Constructing large multi-purpose concrete dams across major river systems
(B) Developing industrial seawater desalination plants for coastal agriculture
(C) Community-led groundwater management in water-stressed areas
(D) Distributing free electrical power subsidies for deep agricultural tube wells

137. Which state-specific package/project has been implemented in Uttar Pradesh to address the severe challenges of recurrent droughts, soil erosion, and water scarcity in its southern dry districts?
(A) Purvanchal Vikas Nidhi
(B) Terai Reclamation Project
(C) Ganga Action Plan
(D) Bundelkhand Water Conservation Project / Package

138. The Desert Development Programme (DDP), initiated by the Government of India in 1977-78, fundamentally aimed to:
(A) Mitigate drought impacts, restore ecological balance, and curb desertification
(B) Promote rapid heavy industrial growth and urban expansion in desert regions
(C) Relocate all rural desert populations permanently to fertile river plains
(D) Systematically explore and extract underground crude oil reserves in deserts

139. Which government initiative primarily funds the creation of individual farm ponds and trenching under wage employment, contributing massively to rural soil moisture conservation?
(A) Skill India Mission
(B) Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)
(C) PM Fasal Bima Yojana
(D) PM Mudra Yojana

140. Consider the following measures related to agricultural water management:
I. Promoting micro-irrigation technologies (drip/sprinkler).
II. Reducing water application losses.
III. Increasing crop productivity and fertilizer use efficiency (fertigation).

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(A) Between the land surface and water table
(B) Deep below the permanently saturated phreatic zone
(C) Confined entirely within unweathered impermeable bedrock
(D) Deeply buried beneath the oceanic floor crust layer

86. The upward movement of water from the water table into the soil profile above it, driven by surface tension and adhesion, occurs in the:
(A) Artesian well
(B) Aquiclude
(C) Karst aquifer
(D) Capillary fringe

87. How does severe over-extraction of groundwater directly affect the topsoil moisture in non-irrigated adjacent lands?
(A) It boosts topsoil moisture by inducing localized convective precipitation
(B) It lowers the water table, uncoupling capillary supply from roots
(C) It causes immediate waterlogging and saturation across the topsoil profile
(D) It maintains zero physical influence on surface and topsoil moisture levels

88. The steady flow of water into a stream during dry periods, sustained entirely by groundwater discharge, is termed:
(A) Surface runoff
(B) Interflow
(C) Baseflow
(D) Flash flood

89. Dark grey or bluish mottled soil colours in the subsurface profile are typically an indicator of:
(A) Rapid accumulation of rich organic matter within topsoil horizons
(B) Severe wind erosion stripping organic particles from field surfaces
(C) Excessive surface application of concentrated nitrogenous fertilizers
(D) Prolonged water saturation causing iron reduction in subsoil

90. Given below are two lists. Match List I with List II**:**

List I: (Groundwater Term)
P. Aquifer
Q. Aquiclude
R. Aquitard
S. Specific Yield

List II: (Definition)
1. A highly impermeable layer (like clay) that neither stores nor transmits water easily
2. A permeable geological formation capable of storing and yielding significant water
3. A poorly permeable layer that restricts but does not completely stop groundwater flow
4. The ratio of the volume of water that drains by gravity from a saturated rock to the rock's total volume

(A) P-2, Q-1, R-3, S-4
(B) P-1, Q-2, R-4, S-3
(C) P-2, Q-3, R-1, S-4
(D) P-4, Q-1, R-2, S-3

91. Soil pollution by heavy metals is particularly dangerous for human health primarily because heavy metals:
(A) Evaporate rapidly into upper air layers, directly causing stratospheric ozone loss
(B) Persist in soil and bioaccumulate along the food chain
(C) Immediately destroy all agricultural crops, rendering land permanently infertile
(D) Transform rapidly into harmless inorganic mineral salts when exposed to light

92. The process by which the concentration of toxic chemicals (like pesticides or heavy metals) increases at successive trophic levels in a food web originating from polluted soil is known as:
(A) Bioleaching
(B) Biomagnification
(C) Bioremediation
(D) Biofortification

93. Acid rain, caused by industrial emissions of SO_2 and NOx, degrades soil quality primarily by:
(A) Leaching base cations and solubilizing toxic aluminum in soil
(B) Substantially elevating soil pH, rendering the topsoil highly alkaline
(C) Depositing dense, impenetrable layers of industrial soot over the surface
(D) Eliminating all agricultural requirement for nitrogenous fertilizer inputs

94. The widespread soil and groundwater pollution in the Jajmau area of Kanpur, Uttar Pradesh, is historically associated with the effluents from which industry?
(A) Sugar mills
(B) Thermal power plants
(C) Leather tanneries discharging chromium

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(D) Cement manufacturing plants

95. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): Controlled application of fly ash from thermal power plants can be used as an amendment in certain agricultural soils.
Reason (R): Fly ash can improve the water-holding capacity of sandy soils and supplies essential micronutrients, provided heavy metal limits are monitored.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

96. The use of biological organisms, such as specific plants (phytoremediation) or microbes, to extract, sequester, or detoxify pollutants from contaminated soil is termed:
(A) Biodegradation
(B) Biomining
(C) Bioremediation
(D) Bioturbation

97. The continuous and excessive use of urea (a nitrogenous chemical fertilizer) without organic amendments generally leads to which long-term effect on soil chemistry?
(A) Substantial increase in overall soil alkalinity
(B) Increased soil acidity (lowering pH)
(C) Complete chemical neutralization of soil pH to 7.0
(D) Rapid accumulation and fixation of excess phosphorus

98. Agricultural runoff laden with excessive chemical fertilizers (especially nitrogen and phosphorus) reaching nearby lakes or wetlands leads to severe ecological degradation known as:
(A) Desertification
(B) Salinization
(C) Laterization
(D) Eutrophication

99. A noticeable consequence of relying entirely on chemical fertilizers while ignoring organic manure is the steady decline in:
(A) Soil Organic Carbon and microbial biomass
(B) Overall compaction and soil bulk density values
(C) Surface runoff flow velocity across field slopes
(D) Soluble salt concentrations and topsoil salinity

100. Consider the following impacts of agricultural inputs on soil and water resources:
I. Destruction of natural soil structure and aggregate stability.
II. Contcontamination of groundwater through nitrate leaching.
III. Significant increase in earthworm populations.
Which of the above options correctly highlight the negative impacts of indiscriminate application of chemical fertilizers?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

101. While the ideal recommended N:P:K (Nitrogen: Phosphorus: Potassium) consumption ratio for Indian soils is generally considered to be 4:2:1, actual usage is heavily skewed towards which nutrient due to historical pricing subsidies?
(A) Nitrogen
(B) Phosphorus
(C) Potassium
(D) Zinc

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102. The Government of India mandated the production of Neem-coated urea primarily to:
(A) Impart a distinctive light green color mandatory for overseas export shipments
(B) Completely eradicate all soil-borne pathogenic fungal spores upon application
(C) Neutralize soil acidity rapidly upon contact with wet topsoil particles
(D) Slow nitrogen release to boost efficiency and deter non-farm misuse

103. Which centrally sponsored scheme in India specifically aims to promote organic farming through a cluster-based approach and Participatory Guarantee System (PGS) certification?
(A) Pradhan Mantri Kisan Samman Nidhi (PM-KISAN)
(B) Paramparagat Krishi Vikas Yojana (PKVY)
(C) Soil Health Card Scheme
(D) Pradhan Mantri Fasal Bima Yojana (PMFBY)

104. Vermicompost, a key input in organic farming to enhance soil fertility and structure, is produced using:
(A) Controlled high-temperature thermo-chemical incineration of crop residues
(B) Industrial chemical digestion and acid hydrolysis of agricultural plant waste
(C) Earthworm digestion and excretion of organic waste
(D) Anaerobic microbial fermentation of raw dairy milk byproducts in tanks

105. Consider the following principles of agriculture:
I. Principle of Health
II. Principle of Ecology
III. Principle of Fairness
IV. Principle of Care
Which of the above statements correctly identify the four core principles of organic agriculture as established by the International Federation of Organic Agriculture Movements (IFOAM)?
(A) I, II, and III only
(B) I, II, and IV only
(C) II, III, and IV only
(D) I, II, III, and IV

106. In India, the National Programme for Organic Production (NPOP) certification process, which deals with export-quality organic standards, is implemented under the aegis of which organization?
(A) APEDA (Ministry of Commerce and Industry)
(B) NABARD
(C) NITI Aayog
(D) Ministry of Environment, Forest and Climate Change

107. The 'Zero Budget Natural Farming' (ZBNF) model, which emphasizes restoring soil health without external chemical inputs, heavily relies on which of the following biological preparations for soil treatment?
(A) Concentrated urea and single superphosphate fertilizers
(B) Jivamrita and Bijamrita formulations
(C) Commercial Genetically Modified (GM) crop seed varieties
(D) Exogenous synthetic plant growth and rooting hormones

108. Organic farming relies heavily on naturally occurring fungi that form a symbiotic association with plant roots, vastly improving the plant's ability to absorb phosphorus and water from the soil. This association is known as:
(A) Rhizobium
(B) Mycorrhizae
(C) Nematodes
(D) Actinomycetes

109. The Government of India's flagship 'Soil Health Card Scheme', aimed at assessing the nutrient status of farms, was launched in 2015 from which location?
(A) Suratgarh, Rajasthan
(B) Varanasi, Uttar Pradesh
(C) Ludhiana, Punjab
(D) Nagpur, Maharashtra

110. Consider the following steps involved in generating a Soil Health Card for a farmer:
1. Laboratory analysis of the soil sample for 12 parameters
2. Grid-based collection of soil samples from the farmer's field
3. Uploading data and printing the Soil Health Card with crop-wise fertilizer recommendations
4. Transport and coding of samples at the soil testing laboratory
Which of the following represents the correct sequence of these steps?
(A) 2, 4, 1, 3
(B) 2, 1, 4, 3
(C) 1, 2, 4, 3
(D) 4, 2, 1, 3

111. How many total parameters (including physical parameters, macronutrients, and micronutrients) are standardly tested under the Soil Health Card Scheme?
(A) 8
(B) 10
(C) 12
(D) 16

112. One of the fundamental objectives of the Soil Health Card scheme is to:
(A) Maximize chemical fertilizer application rates across all agricultural regions
(B) Distribute government land titles freely to landless agricultural laborers
(C) Guide deficiency-based fertilizer application to lower costs and degradation
(D) Mandate exclusive cultivation of high-value commercial cash crops nationwide

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113. Under the standard sampling methodology of the Soil Health Card scheme, what is the specified depth from which a soil sample should typically be collected for general crops?
(A) Collecting shallow surface scrapings from the top 5 cm
(B) V-shaped cut down to 15 cm
(C) Drilling deep subsoil core borings down to 100 cm
(D) Scraping organic surface litter leaves exclusively

114. Which of the following is NOT a micronutrient tested under the Soil Health Card scheme?
(A) Zinc (Zn)
(B) Iron (Fe)
(C) Copper (Cu)
(D) Aluminum (Al)

115. Consider the following approaches and phases related to forest management and community participation in India:
I. Introduction of the Joint Forest Management (JFM) concept
II. Recognition of Forest Rights Act (FRA)
III. Recommendation of 'Social Forestry' by the National Commission on Agriculture
Which of the following represents the correct chronological order of their emergence?
(A) I, III, II
(B) III, I, II
(C) II, I, III
(D) III, II, I

116. The concept of 'Social Forestry' in India was formally brought into prominence in 1976 through the report of the:
(A) Indian Council of Forestry Research and Education (ICFRE)
(B) Planning Commission
(C) National Commission on Agriculture (NCA)
(D) NITI Aayog

117. Under the broad classification of social forestry, 'Farm Forestry' specifically refers to:
(A) Farmers growing trees on private farmland for farm or commercial use
(B) State forest departments planting exotic species along reserved forests
(C) Mandatory planting of timber trees exclusively along rail and road corridors
(D) Compulsory legal conversion of private crop land into dense closed forests

118. Community forestry, a component of social forestry, contributes significantly to soil conservation by:
(A) Fencing off common village lands and transferring ownership to corporations
(B) Promoting intensive monoculture plantations of water-demanding tree species
(C) Enforcing complete prohibition of human access to community green spaces
(D) Planting trees on village common lands to cut runoff and yield fuel/fodder

119. Which fast-growing exotic tree species, heavily promoted during early social forestry programs in India, faced widespread criticism from ecologists for aggressively depleting soil moisture and exhibiting allelopathic effects?
(A) Neem (Azadirachta indica)
(B) Eucalyptus (Eucalyptus tereticornis)
(C) Banyan (Ficus benghalensis)
(D) Peepal (Ficus religiosa)

120. Consider the following statements regarding agroforestry systems:
I. The deep root systems of trees act as nutrient pumps, bringing minerals to the surface.
II. Leaf litter fall enhances soil organic carbon and moisture retention.
III. It severely reduces the overall biomass production per unit area.
Which of the above statements correctly represent the benefits of integrating Agroforestry systems in degraded lands?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

121. The success of Joint Forest Management (JFM) in soil and forest conservation relies on the mutual partnership between the state forest department and:
(A) Multinational industrial timber logging and processing corporations
(B) Foreign non-governmental environmental research organizations
(C) Academic researchers and faculty from international universities
(D) Village communities organized into Forest Committees

122. The concept of 'Land Degradation Neutrality' (LDN) is a core target enshrined in which of the UN Sustainable Development Goals (SDGs)?

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(A) SDG 6 (Clean Water and Sanitation)
(B) SDG 13 (Climate Action)
(C) SDG 14 (Life Below Water)
(D) SDG 15 (Life on Land)

123. Land Degradation Neutrality (LDN) is officially defined by the UNCCD as a state whereby:
(A) Completely restoring all degraded landscapes to pristine natural forests
(B) Land resources for ecosystem function and food security remain stable or grow
(C) Enforcing a total ban on agricultural activities across all degraded soils
(D) Artificially irrigating hyper-arid deserts to convert them into wetlands

124. During the UNCCD COP14 held in New Delhi in 2019, India raised its national target for restoring degraded land by 2030 to:
(A) 10 million hectares
(B) 15 million hectares
(C) 21 million hectares
(D) 26 million hectares

125. Consider the following indicators monitored under global environmental frameworks:
I. Trends in land cover
II. Trends in land productivity or functioning of the land
III. Trends in carbon stocks above and below ground (Soil Organic Carbon)
IV. Trends in human population density in arid regions
Which of the above options correctly identify the three global indicators used by the UNCCD to monitor progress towards Land Degradation Neutrality (LDN)?
(A) I, II, and III only
(B) II, III, and IV only
(C) I, III, and IV only
(D) I, II, and IV only

126. The 'Delhi Declaration', adopted at UNCCD COP14, strongly emphasized which approach to achieve Land Degradation Neutrality?
(A) Relying exclusively on high-yield genetically modified crop monocultures
(B) Relocating entire rural agricultural populations into dense urban hubs
(C) Community participation involving local people, women, and youth in restoration
(D) Applying heavy synthetic fertilizers to accelerate short-term soil yields

127. In the context of LDN, what is meant by the 'response hierarchy' in managing land degradation?
(A) Unregulated land exploitation, agricultural abandonment, and migration
(B) Rapid industrial expansion, heavy urbanization, and land commercialization
(C) Intensive land ploughing, continuous flood irrigation, and fertilization
(D) Avoid, reduce, and reverse land degradation

128. The National Bureau of Soil Survey and Land Use Planning (NBSS&LUP), a premier institute under ICAR responsible for soil mapping of India, is headquartered in:
(A) New Delhi
(B) Dehradun
(C) Nagpur
(D) Hyderabad

129. Based on climate, soil types, and growing period, the NBSS&LUP has systematically classified India into how many major Agro-Ecological Regions (AERs)?
(A) 15
(B) 20
(C) 25
(D) 30

130. Given below are two lists. Match List I with List II**:**
List I: (ICAR Institution)
P. Central Soil Salinity Research Institute (CSSRI)
Q. Indian Institute of Soil and Water Conservation (IISWC)
R. Indian Institute of Soil Science (IISS)
S. Central Arid Zone Research Institute (CAZRI)
List II: (Headquarters)
1. Dehradun
2. Bhopal
3. Jodhpur
4. Karnal
(A) P-4, Q-1, R-2, S-3
(B) P-1, Q-4, R-3, S-2
(C) P-4, Q-2, R-1, S-3
(D) P-2, Q-1, R-4, S-3

131. The NBSS&LUP prepares soil maps of India based on the comprehensive 'Soil Taxonomy' system developed by:
(A) The United States Department of Agriculture (USDA)

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(D) Coastal green belt extending from Chennai to Visakhapatnam along east coast

150. Based on the Desertification Atlas of India, what is identified as the most significant single process causing land degradation in the country in terms of area affected?
(A) Wind erosion
(B) Salinization
(C) Frost shattering
(D) Water erosion

151. Under India's strategy to combat desertification, the 'Bonn Challenge' is a global commitment in which India has pledged to:
(A) Eliminate all synthetic chemical fertilizer usage completely across farms
(B) Restore degraded and deforested landscapes
(C) Transition agricultural machinery away from fossil fuels to renewable energy
(D) Build massive physical containment walls around all expanding desert areas

152. Which of the following is NOT a recognized strategy within the National Action Plan to combat desertification?
(A) Promoting afforestation programs and sustainable agricultural land practices
(B) Enhancing drought preparedness, monitoring, and early warning systems
(C) Promoting shifting cultivation on vulnerable slopes
(D) Strengthening community-led natural resource management systems locally

153. A significant soil conservation challenge in the Indo-Gangetic plains of Uttar Pradesh is the formation of 'Usar' soils. These soils are inherently:
(A) Extremely acidic due to heavy rainfall leaching base minerals from topsoil
(B) Enriched naturally with high concentrations of iron and aluminum oxides
(C) Formed entirely from wind-blown silt deposits transported from dry regions
(D) Salt-affected due to poor drainage and evaporation

154. Severe gully erosion, resulting in the formation of deep ravines, poses a major agricultural and developmental challenge in which specific region of Uttar Pradesh?
(A) Agra, Etawah, and Jalaun along Chambal-Yamuna rivers
(B) Terai belt encompassing Maharajganj, Siddharthnagar, and Gorakhpur districts
(C) Bhabar tract comprising upper foothill regions of Saharanpur district
(D) Vindhyan plateau region spanning Sonbhadra and Mirzapur districts

155. In parts of Eastern and Central Uttar Pradesh, the introduction of extensive canal irrigation networks (like the Sharda Sahayak system) without adequate drainage initially led to massive problems of:
(A) Wind deflation
(B) Waterlogging and secondary salinization
(C) Sand dune formation
(D) Spontaneous underground fires

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156. The Terai region of Uttar Pradesh generally faces which of the following soil management challenges?
(A) Extreme atmospheric aridity combined with chronic deficit of soil moisture
(B) High water table and poor drainage causing seasonal waterlogging
(C) Severe wind-driven erosion operating during hot dry summer months
(D) Total absence of active organic matter across topsoil horizons

157. Western Uttar Pradesh faces a critical challenge regarding soil moisture conservation due to:
(A) Excessive groundwater pumping for crops like sugarcane and paddy
(B) Frequent coastal cyclone occurrences causing severe seawater inundation
(C) Deep ground freezing of surface topsoil horizons during winter months
(D) Total absence of fertile alluvial soil formations across agricultural fields

158. The proliferation of brick kilns across the fertile plains of Uttar Pradesh negatively impacts soil conservation directly by:
(A) Raising local groundwater tables excessively near brick manufacturing sites
(B) Generating atmospheric ozone that eradicates beneficial soil bacteria
(C) Removing fertile agricultural topsoil for brick production
(D) Triggering frequent localized seismic activity and earth crust vibrations

159. Crop rotation is an agronomical method of soil conservation fundamentally defined as:

Which of the above options correctly identify the objectives of the 'Per Drop More Crop' component of PMKSY?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

141. In rooftop rainwater harvesting systems, a 'first flush' diverter is essential to:
(A) Divert initial rain runoff carrying roof dust and debris away from storage
(B) Rapidly pump collected rainwater into high-capacity overhead storage tanks
(C) Inject controlled liquid chlorine doses automatically into the water stream
(D) Measure precise precipitation volumes directly during rainfall events

142. A traditional rainwater harvesting structure widely used in the arid regions of Rajasthan, consisting of an underground cistern to collect surface runoff, is known as a:
(A) Zabo
(B) Bamboo drip
(C) Tanka
(D) Ahar-pyne

143. Recharge trenches are considered more effective than simple recharge pits for improving soil moisture and groundwater in areas that have:
(A) Highly porous surface sandy soils that facilitate instant downward drainage
(B) Swampy, waterlogged soil conditions present continuously throughout the year
(C) High-altitude mountain landscapes covered permanently by dense glacial ice
(D) Shallow bedrock near the surface requiring longer runoff interception structures

144. The catchment area in a rainwater harvesting design is strictly defined as:
(A) Deep underground aquifer rock layers where filtered water settles naturally
(B) Specialized multi-stage physical filtration units used to purify water
(C) The surface receiving rainfall and supplying water to the system
(D) Designated agricultural field plots where harvested rainwater is applied

145. Consider the following outcomes of soil and water management techniques:
I. Dilution of fluoride and nitrate concentration in groundwater.
II. Prevention of seawater intrusion in coastal aquifers.
III. Improvement in soil moisture regime in the vadose zone.
IV. Significant increase in soil surface erosion around the recharge structure.
Which of the above statement(s) correctly highlight the direct benefits of rainwater harvesting on local soil and groundwater properties?
(A) I, II, and III only
(B) I, III, and IV only
(C) II, III, and IV only
(D) I, II, III, and IV

146. Which traditional water harvesting system is indigenous to the hilly terrains of Nagaland, combining forest conservation, water harvesting, and agriculture?
(A) Khadin
(B) Surangam
(C) Eri
(D) Zabo

147. Which Central Ministry acts as the nodal agency for implementing India's National Action Plan for combating desertification under the UNCCD framework?
(A) Ministry of Environment, Forest and Climate Change (MoEFCC)
(B) Ministry of Agriculture & Farmers Welfare
(C) Ministry of Earth Sciences
(D) Ministry of Jal Shakti

148. According to the Desertification and Land Degradation Atlas of India, prepared by the Space Applications Centre (ISRO), which state accounts for the highest land area under desertification/land degradation?
(A) Gujarat
(B) Maharashtra
(C) Rajasthan
(D) Uttar Pradesh

149. The 'Green Wall of India' is an ambitious conceptual proposal aimed at combating desertification. It envisions creating a continuous ecological green belt stretching primarily from:
(A) Kutch to Panipat along the Aravalli range
(B) Continuous coastal belt stretching from Mumbai to Kerala along Western Ghats
(C) Riverine corridor running from Kolkata to Darjeeling along the Teesta river

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75. The 'conjunctive use of water' in irrigation planning refers to:
(A) Allocating canal water strictly to cash crops and rainwater to food crops
(B) Coordinated use of surface and groundwater to prevent depletion
(C) Using treated urban sewage water exclusively for irrigating field crops
(D) Mixing irrigation water with chemical pesticides during a single spraying

76. The 'runoff coefficient' of a drainage basin, a key factor in designing soil moisture conservation structures, is defined as the ratio of:
(A) Total actual evapotranspiration rate to overall annual precipitation volume
(B) Surface runoff volume to total rainfall volume over an area
(C) Deep subsoil groundwater recharge volume relative to surface runoff volume
(D) Maximum peak flood discharge rate relative to minimum seasonal base flow

77. Micro-catchment water harvesting techniques, such as semi-circular bunds and negarima (micro-basins), are most appropriate for restoring soil moisture in:
(A) Arid degraded lands supporting horticulture or agroforestry
(B) Densely vegetated, high-rainfall humid tropical rainforest regions
(C) High-altitude steep mountain glaciers subject to permanent snow cover
(D) Intertidal coastal mangrove swamps subject to daily saltwater flooding

78. A 'watershed' (or catchment area) is best defined geographically as:
(A) An artificial open-water reservoir built to store agricultural irrigation
(B) A geographical zone where annual evaporation far exceeds precipitation
(C) A land area where all runoff drains to a single common water outlet
(D) A deep underground rock stratum containing large fresh water aquifers

79. The fundamental guiding principle of watershed management for effective soil and water conservation is the:
(A) 'Valley to Ridge' approach, initiating all physical works from low points
(B) Exclusively treating main river channels while omitting upper tributaries
(C) Concentrating afforestation efforts strictly within valley basin floors
(D) 'Ridge to Valley' approach, starting treatments from highest points down

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80. The Integrated Watershed Management Programme (IWMP) in India was amalgamated into which major umbrella scheme to enhance water conservation and soil moisture?
(A) MGNREGA
(B) Pradhan Mantri Fasal Bima Yojana (PMFBY)
(C) Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)
(D) National Rural Livelihood Mission (NRLM)

81. The boundary line separating one watershed from an adjacent watershed, typically a ridge or high ground, is called a:
(A) Thalweg
(B) Drainage divide
(C) Riparian zone
(D) Confluence

82. The success of the famous Sukhomajri watershed management project in Haryana highlighted that sustainable soil and water conservation is impossible without:
(A) Continuous massive financial funding provided by international development banks
(B) Total mechanization and automation of all local agricultural field operations
(C) Complete relocation and eviction of indigenous rural populations from the basin
(D) Active participation and resource sharing by local villagers

83. In watershed geomorphology, according to Strahler's stream ordering system, when two first-order streams merge, they form a:
(A) First-order stream
(B) Second-order stream
(C) Third-order stream
(D) Fourth-order stream

84. The 'water table' fundamentally represents the upper surface of which subsurface zone?
(A) Zone of aeration (Vadose zone)
(B) Capillary fringe
(C) Zone of saturation (Phreatic zone)
(D) Bedrock (R horizon)

85. The Vadose zone, critical for soil moisture available to terrestrial plants, is located:

(A) Cultivating the exact same crop continuously on a field year after year
(B) Mechanically inverting subsoil layers into topsoil horizons regularly
(C) Relocating entire farm operations to distant geographical sites annually
(D) Growing different crops in planned sequence on the same land over time

160. Given below are two lists. Match List I with List II**:**

List I: (Crop Rotation Strategy)
P. Including legumes (like moong/urad) in rotation
Q. Alternating deep-rooted crops with shallow-rooted crops
R. Growing dense cover crops (like cowpea) during monsoon
S. Rotating with non-host crops

List II: (Soil Conservation Benefit)
1. Prevents continuous depletion of nutrients from the exact same soil depth
2. Fixes atmospheric nitrogen and improves soil fertility
3. Breaks the life cycle of soil-borne pests and diseases
4. Protects bare soil from heavy raindrop impact and splash erosion

(A) P-2, Q-1, R-4, S-3
(B) P-1, Q-2, R-3, S-4
(C) P-2, Q-4, R-1, S-3
(D) P-3, Q-1, R-4, S-2

161. A standard crop rotation in northern India incorporates pulse crops primarily because pulses:
(A) Require maximum application rates of synthetic urea chemical fertilizers
(B) Fix atmospheric nitrogen in soil via Rhizobium symbiosis
(C) Secrete toxic root compounds that inhibit beneficial soil bacteria growth
(D) Leave zero post-harvest plant residues to contribute to soil organic matter

162. How does the practice of monoculture (growing one crop repeatedly) negatively affect soil physical properties over time?
(A) It fosters a highly diverse, balanced, and resilient soil microbial community
(B) It automatically neutralizes soil pH toward an ideal balanced value of 7.0
(C) It prevents the formation of subsurface hardpans throughout the root zone
(D) It degrades aggregate stability and depletes specific soil nutrients

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163. Incorporating fibrous-rooted grain crops (like wheat or maize) into a rotation helps soil conservation primarily by:
(A) Forming dense root networks that bind soil aggregates against water erosion
(B) Synthesizing biochemical toxins that eliminate parasitic soil nematodes
(C) Extracting trace heavy metals and mineral toxins from deep aquifer layers
(D) Reflecting incoming solar radiation to cool surface topsoil temperatures

164. In conservation agriculture, 'Zero Tillage' (or No-Till) farming benefits soil moisture and structure by:
(A) Deeply tilling and overturning field soil multiple times before sowing
(B) Burning all crop residues and stubble cleanly prior to seed planting
(C) Retaining crop residues and sowing directly without soil disturbance
(D) Removing all surface organic mulches to expose topsoil directly to air

165. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): Drip irrigation is highly effective in conserving soil moisture and managing soil salinity in arid areas.
Reason (R): Drip irrigation delivers water directly to the plant root zone, minimizing evaporation, and maintains a continuous downward push of salts away from the roots.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

166. While organic mulches decompose and add nutrients, plastic mulching (using polyethylene sheets over soil) is widely used in modern horticulture primarily to:
(A) Fix elemental nitrogen directly into topsoil via specialized polymer coating
(B) Rapidly increase surface populations of beneficial soil earthworms
(C) Allow heavy mechanical tractor machinery to drive safely over field crops

aeration and self-ploughing, mixing surface materials deep into the profile.

10. (A) P-1, Q-3, R-4, S-2
Laterite soils form under high temperatures and heavy rainfall, undergoing severe leaching that leaves iron and aluminum oxides. Black soils retain moisture effectively, making them well-suited for cotton cultivation. Peaty soils develop in humid, poorly drained areas with high acidity and organic matter, whereas red soils derive from weathered ancient crystalline metamorphic rocks across sub-humid regions.

11. (B) Silica and Lime
Laterite soils develop in tropical regions experiencing intense seasonal rainfall and elevated temperatures. The heavy leaching process, known as desilication, strips away soluble bases such as lime, potash, and silica from the topsoil horizon. This leaves behind insoluble residues dominated by iron and aluminum oxides, resulting in highly acidic, nutrient-deficient soils requiring substantial fertilization.

12. (B) Diffusion of iron in crystalline and metamorphic rocks
The characteristic reddish coloration of red soils stems fundamentally from the widespread diffusion and oxidation of iron compounds within crystalline and metamorphic rock substrates. Under aerobic and well-drained conditions, ferric oxides impart a distinct red hue, whereas in lower horizons or saturated settings, the soil may appear yellow due to hydration of these underlying iron mineral compounds.

13. (A) Application of Gypsum
Highly alkaline or Usar soils in Uttar Pradesh exhibit elevated exchangeable sodium levels and high pH, which degrade soil structure and restrict plant growth. The addition of agricultural gypsum provides soluble calcium ions that displace sodium from soil exchange sites. Subsequent leaching washes the displaced sodium downward, effectively reclaiming soil permeability and restoring agricultural productivity.

14. (C) Natural erosion occurring without human interference
Geologic erosion refers to the continuous natural process of soil detachment, transport, and deposition driven by wind, water, ice, and gravity without human intervention. Operating slowly over geological timescales, it balances natural pedogenesis to shape landscape landforms, unlike accelerated erosion, which is driven by anthropogenic activities like deforestation, intensive tillage, and overgrazing that degrade topsoil rapidly.

15. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Tree removal in fragile mountainous landscapes directly destabilizes soil layers because root systems physically bind soil aggregates while forest canopies cushion the kinetic force of heavy rainfall. Eliminating vegetative cover increases surface water velocity, severely accelerating topsoil erosion and slope instability, which frequently triggers disastrous landslides across hilly regions during high-intensity monsoonal precipitation events.

16. (C) North-Eastern States
Shifting cultivation, locally known as Jhumming, is widely practiced across the hilly regions of North-Eastern India. This agricultural system involves slashing and burning natural forest plots for temporary farming before abandoning them. Shortened fallow cycles caused by population pressure prevent vegetative regeneration, leaving steep slopes vulnerable to torrential monsoon rains, which cause severe topsoil degradation and gullying.

17. (B) By compacting soil and removing plant cover, reducing water infiltration
Continuous overgrazing by livestock severely accelerates land degradation through two primary mechanisms. First, animals strip protective vegetative cover, directly exposing topsoil particles to rain impact and wind forces. Second, livestock trampling compacts surface soil layers, drastically reducing macroporosity and water infiltration capacity, which in turn increases surface runoff velocity and accelerates topsoil removal.

18. (D) Removing overburden and stripping the protective topsoil and plant cover
Open-cast surface mining severely disrupts natural land structures by stripping away protective vegetation cover, organic topsoil, and underlying overburden strata to access deep mineral deposits. The resulting loose waste dumps and bare exposed rock surfaces are highly

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ANSWERS

1. (B) Pedogenesis
Pedogenesis is the scientific study and process of soil formation, encompassing physical, chemical, and biological transformations that convert weathered rock and parent material into developed soil horizons. Over extended timeframes, climate, organic matter accumulation, topographical factors, and microbial activities interact dynamically to continuously develop distinct soil profiles across varied geographical environments.

2. (D) C Horizon
The C horizon in a soil profile represents the layer composed of unweathered or partially weathered parent material, situated directly beneath the solum layers. It lacks the properties of the overlying topsoil and subsoil while retaining the essential mineral character of the original bedrock from which upper horizons gradually develop through pedogenic processes over time.

3. (A) Time
Hans Jenny formulated the fundamental state factor equation of soil formation, defining soil properties as a function of climate, organisms, relief or topography, parent material, and time. Time acts as a critical independent variable, determining the total duration available for physical, chemical, and biological processes to alter raw parent minerals into mature, fully differentiated soil horizons.

4. (C) Eluviation
Eluviation describes the downward washing or mobilization of dissolved soil constituents, organic complexes, and fine suspended clay particles from upper soil layers by percolating water. This process depletes the upper horizon of these materials and transports them lower into the profile, leading to the formation of an eluvial horizon characterized by lighter color and altered texture.

5. (A) The release of chelating organic acids by lichens and plant roots
Biological weathering is greatly accelerated when organisms such as lichens, mosses, and vascular plant roots excrete organic chelating acids. These specialized biochemical compounds actively target mineral lattices in bedrock, solubilizing essential cations like aluminum and iron, thereby destabilizing rock structures while accelerating chemical decomposition and topsoil formation under natural ecosystem conditions.

6. (D) Improving soil structure and cation exchange capacity
Humus plays a pivotal role in maintaining physical and chemical soil health. Its complex organic molecules bind mineral particles into stable aggregates, enhancing soil aggregation, porosity, and aeration. Furthermore, humus possesses a remarkably high cation exchange capacity, allowing it to adsorb and retain vital plant nutrient cations against leaching while improving moisture retention.

7. (B) Alluvial Soil
Alluvial soils cover the vast majority of agricultural lands across India, occupying over forty percent of the total geographical area. Formed predominantly by sediment deposition from major river systems like the Indus, Ganga, and Brahmaputra, these soils exhibit exceptional fertility, moderate permeability, and high agricultural output across the northern plains and coastal deltas.

8. (C) Bangar represents older, less fertile alluvium containing calcareous kankar nodules.
In the Indo-Gangetic plains, alluvial soils are categorized into older Bangar and newer Khadar formations. Bangar occupies higher terraces above current floodplains, comprising older leached sediments with characteristic calcareous kankar nodules. Conversely, Khadar represents fresh flood deposits that are continuously replenished annually along river courses, possessing higher silt content and superior inherent fertility.

9. (D) Montmorillonite
Black soils, or Regur, exhibit unique shrink-swell behaviour primarily due to a high concentration of montmorillonite clay minerals. Upon absorbing moisture, the mineral lattice expands, causing the soil to swell significantly, while drying leads to severe shrinkage and deep vertical cracking. This natural cracking process promotes soil

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temperatures and reducing thermal energy transfer. Furthermore, it shields the surface from drying wind currents, significantly decreasing vapor pressure gradients and suppressing direct soil water evaporation rates across fields.

64. (C) Increases soil water-holding capacity and improves aggregate stability
Sandy soils inherently possess coarse textures, large macropores, and low moisture retention. Incorporating organic amendments like compost adds colloidal humic substances that bind loose sand particles into stable soil aggregates. This structural improvement increases overall microporosity and total water-holding capacity, enabling sandy soils to store capillary water effectively for plant root uptake during dry periods.

65. (A) I, II, and III only
Under the Ramsar Convention, wetlands are broadly defined to include natural or artificial, permanent or temporary water areas with static or flowing fresh, brackish, or salt water. This definition encompasses coastal marine zones where water depth at low tide does not exceed six meters, but excludes environments completely devoid of aquatic or semi-aquatic vegetation.

66. (D) Store large carbon amounts in undecayed organic matter
Peatlands are waterlogged wetland ecosystems where anaerobic, saturated soil conditions severely inhibit microbial decomposition. Consequently, partially decayed plant material accumulates over millennia as thick layers of carbon-rich peat. Occupying only three percent of Earth's land surface, peatlands store vast amounts of organic carbon, playing an essential role in global carbon sequestration and climate regulation.

67. (A) Ecological character has changed or may change due to human activities
The Montreux Record is a specialized register maintained under the Ramsar Convention that highlights international wetland sites facing severe ecological threats. It includes designated wetlands where adverse changes in ecological character have occurred, are occurring, or are likely to occur due to technological developments, pollution, land degradation, or other direct human disturbances requiring prioritized conservation action.

68. (C) Bakhira Wildlife Sanctuary
Bakhira Wildlife Sanctuary, situated in the Sant Kabir Nagar district of Uttar Pradesh, is a designated Ramsar wetland of international importance. This prominent freshwater marsh provides critical habitat for numerous migratory bird species while maintaining regional hydrologic equilibrium, buffering localized seasonal floods, and recharging surrounding groundwater aquifers and agricultural topsoil moisture levels.

69. (A) Filter pollutants, retain nutrients, and trap surface water sediments
Wetlands are often termed the "kidneys of the landscape" due to their water purification capabilities. As surface runoff flows through wetland vegetation and hydric soils, physical, chemical, and biological processes trap suspended sediments, absorb excess agricultural nutrients like nitrogen and phosphorus, and detoxify incoming pollutants, significantly improving downstream water quality across regional watersheds.

70. (D) Hydric soils
Hydric soils are defined as soils that form under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in upper horizons. These prolonged wetland conditions force soil microbes to use alternative electron acceptors, resulting in chemical reduction of iron and manganese, producing characteristic grey or mottled soil matrices.

71. (B) Increased local flooding and reduced groundwater recharge
Converting natural wetlands into urban developments replaces permeable hydric soils with impervious surfaces like concrete and asphalt. Removing natural wetland storage buffers eliminates their capacity to absorb floodwaters, accelerating surface runoff flow. Consequently, local flooding hazards increase significantly, while natural rainwater percolation into underlying subsoil layers and groundwater aquifers is drastically reduced.

72. (C) Retain surface runoff to promote infiltration into the aquifer
Percolation tanks are artificially constructed earthen reservoirs designed to impound monsoonal surface runoff across permeable subsoil strata. Their primary objective is to

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susceptible to rapid detachment by wind and rainfall, leading to massive sediment runoff, gully formation, and environmental degradation.

19. (A) Sheet erosion
Sheet erosion involves the uniform removal of thin, successive layers of topsoil from sloping fields by unchanneled overland surface water flow. Because topsoil is lost gradually over wide areas without forming conspicuous channels or rills, this erosion type often remains unnoticed until significant soil fertility loss, structural degradation, and diminished crop yields become evident to agricultural managers.

20. (C) I and III only
High rainfall intensity delivers substantial kinetic energy that detaches soil aggregates, while steep topographic slopes accelerate surface runoff velocity, creating powerful forces that drive water-induced soil erosion. Conversely, a dense vegetative canopy acts as a protective shield, intercepting falling raindrops and binding soil particles, thereby mitigating erosion rates rather than accelerating topsoil detachment or displacement.

21. (B) Splash erosion, Sheet erosion, Rill erosion, Gully erosion
Water erosion progresses through distinct sequential stages of increasing severity. Raindrop impacts initially dislodge soil particles during splash erosion. Accumulated runoff then sweeps across fields, stripping uniform topsoil layers via sheet erosion. As water concentrates into small flowing channels, rill erosion develops, which ultimately expands into deep, impassable gullies that severe landscape drainage patterns completely.

22. (D) Saltation
Saltation is the dominant mechanism of wind erosion, moving medium-sized soil particles ranging between zero point one and zero point five millimeters in diameter. Driven by turbulent winds, these intermediate particles hop and bounce short distances along the ground, dislodging finer dust into atmospheric suspension upon landing while propelling larger sand grains forward through surface creep.

23. (B) Gully erosion
The infamous badlands and ravines of the Chambal River valley represent an extreme form of gully erosion. Intense monsoonal runoff cuts deeply into soft, un-consolidated alluvial soils, forming wide networks of steep channels and rugged terrain. Over time, unchecked gully propagation degrades productive agricultural land into barren, highly dissected landscapes unfit for conventional farming practices.

24. (C) Splash erosion
Splash erosion represents the initial physical stage of water erosion, triggered when high-velocity raindrops directly strike bare, unprotected soil surfaces. The kinetic energy released breaks down surface soil aggregates, splashing loosened soil particles upwards and outwards. This process seals topsoil pores with fine sediments, reducing water infiltration rates and promoting rapid surface runoff formation across fields.

25. (A) I, II, and III only
Wind erosion comprises three main transport modes: fine particles remain suspended in air currents, intermediate particles move via bouncing saltation (accounting for 50-70% of total wind movement), and coarse grains roll along the surface via creep. Wind erosion is severe in arid and semi-arid landscapes with sparse vegetation, rather than humid, densely forested regions.

26. (A) They have stronger soil aggregation due to clay and humus content.
Loamy soils contain balanced proportions of sand, silt, clay, and organic matter, enabling the formation of stable soil aggregates bonded by colloidal complexes. These well-developed aggregates increase effective particle mass and structural cohesion, making loams significantly more resistant to detachment and transport by wind forces compared to non-cohesive, loosely structured fine sandy soils lacking organic binding agents.

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27. (B) Tidal waves, storm surges, and longshore currents
Coastal erosion along Indian shorelines is primarily driven by hydrodynamic forces, including high-energy wave action, storm surges, tidal fluctuations, and longshore sediment transport currents. These oceanic forces continuously scour, dislodge, and redistribute beach sediments and coastal bluffs, a process further intensified by monsoonal weather patterns, rising sea levels,

Additionally, legumes harbour symbiotic Rhizobium bacteria within root nodules, fixing inert atmospheric nitrogen into plant-available forms, thereby enhancing overall soil fertility and crop productivity naturally.

46. (C) Nitrogen, Phosphorus, Potassium
Primary macronutrients are essential plant nutrients required in relatively large quantities for normal growth, vegetative development, and reproduction. Nitrogen, phosphorus, and potassium constitute this group. Nitrogen drives vegetative growth and chlorophyll synthesis, phosphorus powers metabolic energy transfer and root development, while potassium regulates cellular osmotic potential, enzyme activation, stomatal movement, and disease resistance within plant tissues.

47. (D) Calcium
Calcium is a key secondary macronutrient essential for maintaining structural integrity in plants, functioning as calcium pectate in the middle lamella of cell walls. It regulates cell division, membrane permeability, and root tip elongation. In soil chemistry, calcium plays a crucial role in displacing hydrogen and aluminum ions, neutralizing soil acidity, and improving soil structure.

48. (C) Azolla-Anabaena symbiotic complex
The symbiotic association between the floating freshwater fern Azolla and the nitrogen-fixing cyanobacterium Anabaena azollae is widely used as a biofertilizer in flooded paddy fields. The cyanobacteria fix atmospheric nitrogen within fern leaves, releasing assimilable nitrogen into water and soil upon decomposition, thereby enhancing soil nitrogen reserves and reducing reliance on synthetic nitrogenous fertilizers.

49. (B) Incorporating green leguminous crops into the soil
Green manuring involves growing fast-growing leguminous crops, such as dhaincha or sunn hemp, and plowing them directly into the soil while still green and succulent. This agricultural practice adds substantial organic matter, fixes atmospheric nitrogen, enhances microbial activity, and improves soil structure, water-holding capacity, and nutrient availability for subsequent crops without relying solely on synthetic inputs.

50. (A) P-2, Q-3, R-4, S-1
Nitrogen deficiency causes general yellowing starting on older leaves as mobile nitrogen translocates to young growth. Phosphorus deficiency produces dark green foliage accompanied by distinct purple pigmentation due to anthocyanin accumulation. Potassium deficiency manifests as leaf margin burning or marginal chlorosis, while iron deficiency causes interveinal chlorosis appearing first on young immotile leaves.

51. (A) High clay and organic content with strong nutrient retention
Cation Exchange Capacity measures the total capacity of a soil to retain and exchange essential nutrient cations like calcium, magnesium, potassium, and ammonium. A high capacity value signifies elevated proportions of clay minerals and organic matter, providing abundant negatively charged colloidal surfaces that hold cationic nutrients securely against leaching while supplying them to plant roots.

52. (C) Combining chemical, organic, and biological nutrient sources balancedly
Integrated Nutrient Management is a holistic strategy that combines chemical fertilizers, organic manures, green manures, and biofertilizers to optimize crop productivity. By balancing synthetic and organic inputs, this approach maintains soil physical structure, enhances microbial diversity, improves nutrient use efficiency, and prevents long-term land degradation, ensuring sustainable agricultural production without compromising soil ecosystem health.

53. (A) Land degradation in drylands caused by climate variations and human activities
According to the UNCCD, desertification refers specifically to land degradation occurring within arid, semi-arid, and dry sub-humid regions resulting from various factors, including climatic variability and unsustainable human activities. It involves the progressive loss of biological or economic productivity in terrestrial ecosystems, rather than the natural expansion of pre-existing hyper-arid desert biomes over geological time.

54. (D) Overgrazing and unsustainable agricultural practices
Overgrazing by livestock and unsustainable agricultural practices represent the primary

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peak velocity of concentrated surface runoff flow within the channel. By slowing water movement, check dams allow suspended sediment to settle out, preventing deeper gully erosion and stabilizing drainage lines.

37. (A) Black cotton soils (Vertisols) with poor drainage
Broad Bed and Furrow systems are specialized land-layout configurations designed for heavy clay soils such as Vertisols. These soils exhibit low infiltration rates when saturated, causing waterlogging during monsoons. The raised beds store soil moisture for crop growth, while the gentle slope of the intervening furrows facilitates safe, controlled surface drainage without inducing erosion across fields.

38. (D) Retains runoff and conserves moisture to aid sapling growth
Contour trenching involves digging continuous or staggered trenches along hill contours in degraded sloping areas. These trenches intercept overland surface runoff, trap washed-off soil particles, and store rainwater directly in the subsoil. By enhancing localized soil moisture retention, contour trenching significantly increases the survival, establishment, and long-term growth rates of planted tree saplings during afforestation initiatives.

39. (B) Stone-filled wire baskets forming permeable retaining structures
Gabion structures are constructed by filling heavy-duty, galvanized steel wire mesh baskets with dense rock aggregate. These flexible, highly permeable retaining structures are used in soil conservation to stabilize eroding streambanks, control gully formation, and reduce flow velocity. Their porous design dissipates runoff energy and traps fine sediment while allowing trapped water to drain safely through the rock matrix.

40. (A) P-3, Q-1, R-4, S-2
Shelterbelts consist of dense tree rows planted perpendicular to winds to reduce wind velocity. Strip cropping alternates erosion-resisting and erosion-permitting crops to intercept surface runoff. Cover cropping involves growing dense vegetative cover during fallow periods to shield exposed topsoil from raindrop impact, while grassed waterways are natural drainage paths lined with perennial grasses to convey runoff safely.

41. (D) Creating barriers of close-growing crops that slow runoff from adjacent strips
Strip cropping reduces soil erosion by alternating bands of wide-spaced, erosion-permitting crops with dense, erosion-resisting crops such as legumes or grasses across field slopes. The close-growing crop bands act as physical barriers, slowing the flow velocity of surface runoff from upper strips, enhancing water infiltration, and trapping dislodged sediment particles before they leave the agricultural field.

42. (A) By intercepting raindrops and reducing their kinetic energy before impact
Forest canopies act as an effective physical buffer against soil erosion during intense precipitation events. By intercepting falling raindrops, foliage absorbs their initial kinetic energy and breaks large drops into finer mist or slow drip flow. This significant reduction in impact velocity minimizes splash erosion, prevents surface soil compaction, and maintains high water infiltration capacity across topsoil layers.

43. (B) Grasses
Agrostology is the branch of botanical science dedicated to the study of grasses, including their taxonomy, morphology, and ecological functions. In soil conservation, agrostology provides essential knowledge for selecting deep-rooted, perennial grass species that effectively bind topsoil particles, reinforce earthen bund structures, stabilize steep slopes, and vegetate water drainage channels against hydraulic erosion processes.

44. (B) Vetiver (Khus)
Vetiver grass, scientifically known as Vetiveria zizanioides, is widely recognized for biological soil and water conservation. Its deep, dense, and finely structured fibrous root system penetrates several meters into the soil, anchoring upper earth layers securely. Planted in continuous hedges along contours, vetiver slows surface runoff, traps sediment, stabilizes gully banks, and reinforces earthen structures effectively.

45. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Leguminous cover crops deliver exceptional soil conservation and ecological benefits when integrated into crop rotations. Their dense root networks bind topsoil particles against water and wind erosion while improving soil structure.

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and coastal infrastructure development lacking sustainable sediment planning.

28. (B) Its formation takes centuries, making it non-renewable on a human timescale.
Topsoil represents a vital, non-renewable natural resource on a human timescale, requiring centuries of weathering and biological activity to form just a few centimeters of fertile layer. Conserving topsoil is imperative for agricultural sustainability, as losing this organic-rich upper horizon drastically diminishes crop yields, reduces land resilience, and destroys delicate soil micro-ecosystems that cannot be rapidly restored.

29. (A) Removing fine, nutrient-rich soil particles and organic matter
Severe soil erosion preferentially strips away the finest topsoil fraction, which contains the highest concentrations of organic carbon, nitrogen, phosphorus, and microbial life. The removal of these nutrient-rich layers reduces cation exchange capacity, degrades soil structure, and diminishes effective water-holding potential, thereby directly decreasing agricultural crop productivity and requiring higher external input usage for crop growth.

30. (A) 1, 2, 3, 4
Unchecked land erosion initiates a sequential environmental degradation pathway within river ecosystems. Soil erosion increases sediment load suspended in runoff, which eventually settles downstream, causing widespread riverbed siltation. Consequently, the river channel's total water-carrying capacity is reduced, which sharply increases the frequency, speed, and severity of overbank flooding during periods of intense seasonal rainfall events.

31. (D) Applying mulching and contour tillage to retain rainfall directly where it falls
In-situ soil moisture conservation focuses on retaining rainfall where it lands within the agricultural field, avoiding off-site water collection. Agronomic practices like contour farming, mulching, conservation tillage, and broad-bed furrows enhance infiltration, minimize surface runoff, and suppress soil evaporation. These methods preserve subsoil moisture reserves, ensuring continuous availability for crop root uptake during dry rainless periods.

32. (C) Shrinking arable land and reducing crop yields, leading to food insecurity
Unchecked soil degradation poses a critical threat to national food security by stripping fertile topsoil, lowering nutrient availability, and reducing water retention across farm tracts. As productive arable land shrinks and crop yields drop, meeting the dietary requirements of a growing population becomes increasingly difficult, elevating national food vulnerability and destabilizing rural agricultural economies depend on sustainable yield outputs.

33. (B) Estimate long-term soil loss from sheet and rill erosion on specific land areas
The Universal Soil Loss Equation is an empirical mathematical model developed to estimate average annual soil loss caused by sheet and rill erosion. By multiplying parameters for rainfall erosivity, soil erodibility, slope length, slope steepness, cover management, and conservation practices, this model enables conservation planners to evaluate erosion risks and design effective land management strategies for watersheds.

34. (D) Slopes up to 6% and low to medium rainfall
Contour bunding is a mechanical soil conservation technique involving earthen embankments constructed across land slopes along contour lines. This practice is most effective on mild slopes up to six percent in low to medium rainfall areas. It slows surface runoff, intercepts eroded soil particles, and promotes maximum rainwater infiltration, effectively conserving both topsoil and subsoil moisture reserves.

35. (B) II, I, III, IV
Constructing bench terraces follows a systematic chronological sequence to ensure structural stability on steep slopes. A detailed topographical survey is conducted first to establish accurate contour alignments. Earth is then excavated from the upper half of each terrace step and deposited onto the lower half to construct a level bed, followed finally by installing drop outlets for safe runoff disposal.

36. (C) To slow runoff velocity and trap eroded sediment
Check dams are small, permeable barrier structures built across gully beds using locally available materials like stones, timber, or concrete. Their primary function is to reduce the

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drivers of land degradation and desertification in India. Excessive grazing strips protective vegetative cover and compacts surface soils, while continuous cropping, improper irrigation, and deforestation accelerate topsoil erosion, organic matter depletion, and soil salinization, gradually degrading dryland productivity across semi-arid regions nationwide.

55. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Intensive canal irrigation in drylands without adequate drainage systems causes subsoil water tables to rise rapidly near the surface. As excess groundwater evaporates under arid atmospheric conditions, dissolved salts are drawn upward via capillary action and deposited in the topsoil. This process of secondary salinization degrades soil fertility, destroys vegetative cover, and triggers land desertification.

56. (C) Deforestation and mining in hills removing the natural barrier to Thar desert
The Aravalli mountain range historically functioned as a natural physical barrier preventing the eastward expansion of the Thar Desert into fertile plains. However, extensive deforestation, illegal mining, and habitat degradation along the range have breached this barrier. Consequently, wind-blown sand dunes advance eastward, exacerbating soil degradation, land aridification, and localized desertification processes across north-western regions.

57. (D) Establishing grid plantings of drought-resistant trees and xerophytic shrubs
Stabilizing active, shifting sand dunes in arid zones requires vegetative methods using drought-resistant trees and xerophytic shrubs. Planting shelterbelts, windbreaks, and deep-rooted species in micro-catchment grids creates physical barriers that diminish wind velocity at ground level, anchor sand particles with extensive root systems, and gradually restore organic matter and soil structure to desert ecosystems.

58. (A) A positive feedback loop accelerating desertification
When drought and land mismanagement strip vegetative cover, exposed bare soil reflects more solar radiation, increasing surface albedo. This surface cooling suppresses localized atmospheric convection and thermal lift, reducing cloud formation and precipitation. The resulting rainfall deficit further starves remaining vegetation, creating a self-reinforcing positive feedback loop that accelerates dryland degradation and desertification processes over time.

59. (B) Capillary water
Capillary water is retained within soil micropores by surface tension and adhesive forces against the downward pull of gravity. Held between field capacity and permanent wilting point potentials, this liquid water fraction serves as the primary reservoir readily absorbed by plant root systems to sustain transpiration, metabolic activities, and nutrient uptake under typical agricultural field conditions.

60. (A) I and II only
Applying organic mulch forms a protective physical buffer over soil, blocking direct solar radiation and insulating topsoil from drying winds. Similarly, zero-tillage leaves crop residues on the surface, suppressing soil moisture evaporation and maintaining aggregate structure. Conversely, intensive deep summer ploughing exposes subsoil directly to hot ambient air, accelerating soil drying and evaporation loss.

61. (A) Free gravitational water drains and downward movement slows significantly
Field capacity represents the amount of water retained in soil after excess gravitational water has fully drained away and the rate of downward movement has significantly decreased, typically occurring two to three days following thorough wetting. At field capacity, soil macropores are filled with air while micropores remain saturated, optimizing conditions for plant root uptake.

62. (C) Wilting Point (Permanent Wilting Point)
The permanent wilting point represents the soil moisture threshold where remaining water is held tightly within tiny micropores by high matric suction forces, typically around minus fifteen bar potential. Plant roots can no longer exert sufficient suction to extract water, causing plants to wilt permanently and fail to recover turgidity even if placed in a humid environment.

63. (D) Forming a physical barrier that reduces solar radiation and wind action on soil
Mulching conserves soil moisture primarily by placing a protective physical barrier over exposed ground surfaces. This layer shades the soil from direct solar radiation, lowering topsoil

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(D) Suppress weed growth and reduce topsoil moisture evaporation

167. The modern technique of 'Fertigation' contributes to soil health and moisture management by:
(A) Broadcasting dry granular fertilizers over waterlogged field surfaces
(B) Applying dissolved fertilizers directly to root zones via drip irrigation
(C) Applying heavy flood irrigation prior to spreading dry organic compost
(D) Spraying liquid chemical fertilizers from airplanes during rain events

168. Consider the following statements regarding agricultural practices:
I. Reduction in soil erosion due to undisturbed soil structure.
II. Improved soil moisture retention due to surface residue.
III. Significant decrease in fuel and labor costs for the farmer.
Which of the above options correctly identify the advantages of the 'Zero Tillage' technique?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

169. Consider the following functions regarding soil amendments:
I. They absorb water during rainfall/irrigation and release it slowly to plant roots during dry spells.
II. They increase soil aeration upon swelling and shrinking.
III. They permanently convert sandy soils into clay soils.
IV. They reduce irrigation frequency and water runoff.
Which of the above options correctly identify the functions of agricultural hydrogels (superabsorbent polymers) when mixed into the soil?
(A) I, II, and IV only
(B) I, II, and III only
(C) II, III, and IV only
(D) I, III, and IV only

170. Subsurface Drip Irrigation (SDI) is considered superior to surface drip irrigation in hot, arid climates fundamentally because SDI:
(A) Buries driplines to minimize surface evaporation and weed growth
(B) Sprays water mist high into ambient air to cool local field microclimates
(C) Costs substantially less and requires zero technical expertise to install
(D) Safely utilizes untreated industrial wastewater for open crop irrigation

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hold water over extended periods, facilitating deep percolation and recharge into underlying unconfined groundwater aquifers. This artificial recharge elevates localized groundwater tables, improves subsoil moisture regimes, and enhances nearby well yields.

73. (D) A low-cost micro-pond lined with plastic for rainwater harvesting
A Jalkund is a low-cost micro-rainwater harvesting structure widely deployed in hilly and water-scarce agricultural regions. It consists of an excavated small pit or pond lined with durable silpaulin plastic sheets to prevent seepage losses. Jalkunds capture direct rainfall and surface runoff, storing essential water reserves for supplemental irrigation and livestock during dry spells.

74. (A) Intercept and store subsurface aquifer flow for dry-season use
Subsurface groundwater dams are impermeable barriers constructed beneath permeable riverbed alluvium down to underlying bedrock. Built across seasonal stream beds, these structures obstruct natural underground groundwater flow within alluvial aquifers. By impounding water beneath the surface, subsurface dams prevent evaporative water losses, preserve subsoil moisture reserves, and secure reliable water supplies for dry-season utilization.

75. (B) Coordinated use of surface and groundwater to prevent depletion
The conjunctive use of water in agricultural management involves the planned, coordinated utilization of both surface water supplies and underground aquifer resources. Combining surface canal water with groundwater extraction optimizes overall water availability, mitigates regional groundwater depletion, prevents waterlogging and secondary salinization in low-lying fields, and maintains favorable soil moisture balances across agricultural command areas.

76. (B) Surface runoff volume to total rainfall volume over an area
The runoff coefficient of a watershed is defined as the dimensionless ratio of total surface runoff volume to total rainfall volume generated over a specific catchment area during a storm event. Influenced by soil permeability, slope steepness, land cover, and surface saturation, this parameter is critical for designing appropriate soil conservation structures and rainwater harvesting systems.

77. (A) Arid degraded lands supporting horticulture or agroforestry
Micro-catchment water harvesting systems, including semi-circular bunds and negarima micro-basins, collect surface runoff from small catchment areas and concentrate it directly within crop root zones. These low-cost earthworks are effective for restoring soil moisture, establishing fruit trees, and supporting agroforestry plantations on degraded, crusted soils located in arid and semi-arid regions facing unpredictable rainfall patterns.

78. (C) A land area where all runoff drains to a single common water outlet
A watershed, or catchment basin, is a topographically defined land area where all surface runoff originating from precipitation drains through a connected network of streams and channels to a single common outlet, such as a river, lake, or reservoir. It forms the fundamental hydrological unit for planning sustainable soil and water conservation projects.

79. (D) 'Ridge to Valley' approach, starting treatments from highest points down
The fundamental guiding principle of sustainable watershed management is the 'Ridge to Valley' strategy. Soil and water conservation treatments begin at the highest ridgelines to reduce surface runoff velocity, trap eroded sediment, and maximize in-situ groundwater recharge. Treating upper catchment areas protects lower valley structures and fertile bottomlands from silting, flash flooding, and hydraulic degradation.

80. (C) Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)
In India, the Integrated Watershed Management Programme was integrated into the Pradhan Mantri Krishi Sinchayee Yojana as its Watershed Development Component. This consolidation aims to enhance water harvesting, ridge area treatment, soil conservation, and groundwater recharge across rainfed areas, ensuring comprehensive watershed management to improve soil moisture, agricultural productivity, and climate resilience for farming communities nationwide.

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Elevating soil organic carbon improves soil aggregate stability, nutrient retention, and water infiltration. Enhanced water-use efficiency shields agricultural systems against climate vulnerabilities, erratic monsoonal rainfall, and severe dry spells across rainfed belts.

136. (C) Community-led groundwater management in water-stressed areas
Atal Bhujal Yojana is a Central Sector Scheme focused on improving groundwater management through community participation in water-stressed areas across designated states. The scheme emphasizes participatory groundwater budgeting, community-led water security plans, artificial groundwater recharge structures, and demand-side management practices to ensure sustainable aquifer extraction and enhance localized subsoil moisture regimes for sustainable farming.

137. (D) Bundelkhand Water Conservation Project / Package
The special Bundelkhand Development Package was introduced to address chronic drought, severe topsoil erosion, and acute water scarcity in the dry Bundelkhand region of Uttar Pradesh. The package funds extensive water conservation works, including check dams, percolation tanks, field bunding, dug wells, and farm ponds to retain monsoonal runoff, restore groundwater tables, and improve soil moisture retention.

138. (A) Mitigate drought impacts, restore ecological balance, and curb desertification
The Desert Development Programme was launched by the Government of India in 1977-78 to address environmental challenges in hot and cold arid regions. The program's objectives include controlling desertification, restoring ecological balance, conserving soil moisture, and promoting afforestation and pasture development to enhance the land's productive capacity and mitigate severe drought impacts in drylands.

139. (B) Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)
The Mahatma Gandhi National Rural Employment Guarantee Act serves as a major source of funding for public works focused on natural resource management. MGNREGA funds labor-intensive activities such as farm pond construction, gully plugging, contour trenching, check dam creation, and afforestation, contributing significantly to soil conservation, surface water harvesting, and subsoil moisture retention across rural India.

140. (D) I, II, and III
The 'Per Drop More Crop' component of Pradhan Mantri Krishi Sinchayee Yojana aims to maximize agricultural water productivity. It promotes micro-irrigation systems, such as drip and sprinkler irrigation, minimizing conveyance and evaporation losses. Furthermore, it supports fertigation, integrating water and nutrient delivery to enhance fertilizer use efficiency, maintain subsoil moisture regimes, and increase crop yields.

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141. (A) Divert initial rain runoff carrying roof dust and debris away from storage
In rooftop rainwater harvesting systems, a first flush diverter is an essential component designed to isolate the initial rain runoff. The first rain spell carries accumulated roof dust, bird droppings, leaves, and atmospheric pollutants. Diverting this initial contaminated volume away prevents debris from entering storage tanks, thereby safeguarding harvested water quality for recharge or consumption.

142. (C) Tanka
A Tanka is a traditional rainwater harvesting structure widely used in the arid regions of Rajasthan. It consists of a circular underground storage cistern lined with masonry or lime, designed to collect surface runoff from an artificially prepared catchment area. Tankas preserve harvested drinking water through dry summer months while preventing evaporative water losses in hyper-arid desert environments.

143. (D) Shallow bedrock near the surface requiring longer runoff interception structures
Recharge trenches are linear water harvesting structures designed to intercept surface runoff across land slopes. They are effective in areas with shallow impervious bedrock or low-permeability surface layers where simple recharge pits lack sufficient contact surface. Linear trenches increase the surface area available for infiltration, promoting water percolation along fractures and recharging underlying aquifers efficiently.

formation that stores water but cannot transmit it. An aquitard restricts groundwater movement, allowing slow seepage, while specific yield measures the ratio of water volume that drains under gravity from a saturated rock formation relative to its total bulk volume.

91. (B) Persist in soil and bioaccumulate along the food chain
Heavy metal soil pollution poses significant human health risks because heavy metals like lead, cadmium, arsenic, and chromium do not undergo biological or chemical degradation. They persist indefinitely in topsoil, where plant roots readily absorb them. Consequently, these toxic elements accumulate in agricultural crops and biomagnify up the food chain, causing severe biological toxicity and chronic human diseases.

92. (B) Biomagnification
Biomagnification describes the progressive accumulation and increasing concentration of persistent toxic substances, such as heavy metals or synthetic organochlorine pesticides, at higher trophic levels in a food chain. Originating from contaminated soils, these bioaccumulative toxins enter primary producers and concentrate progressively in consumers, posing severe physiological risks to apex predators and humans consuming contaminated agricultural products.

93. (A) Leaching base cations and solubilizing toxic aluminum in soil
Acid rain, carrying dissolved sulfur dioxide and nitrogen oxides, significantly degrades soil quality. The influx of hydrogen ions displaces essential base cations like calcium, magnesium, and potassium from soil exchange sites, causing them to leach below the root zone. Furthermore, lowered soil pH solubilizes bound aluminum minerals into toxic phytotoxic forms that severely damage plant roots.

94. (C) Leather tanneries discharging chromium
Industrial soil and groundwater contamination in the Jajmau industrial zone of Kanpur, Uttar Pradesh, stems predominantly from untreated effluents discharged by numerous leather tanneries. These wastewater discharges contain high concentrations of toxic hexavalent chromium and heavy salts, which accumulate in topsoil, contaminate local groundwater supplies, degrade soil structure, and present severe environmental and public health hazards.

95. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Controlled application of industrial fly ash serves as an effective soil amendment for modifying sandy land textures. Fly ash consists of fine mineral particles that alter soil pore geometry, enhancing water-holding capacity and aeration. Additionally, it supplies essential micronutrients such as zinc, iron, and boron, provided application rates are monitored to prevent heavy metal accumulation.

96. (C) Bioremediation
Bioremediation is an environmental biotechnology that utilizes biological organisms, including specialized microorganisms and plants, to remove, neutralize, or sequester pollutants from contaminated soil and water systems. Microbes degrade organic pollutants like hydrocarbons into harmless compounds, while hyperaccumulating plants extract and immobilize heavy metals through phytoremediation, restoring degraded soil ecosystems naturally without chemical disturbance.

97. (B) Increased soil acidity (lowering pH)
Continuous, heavy application of urea without balanced organic amendments induces long-term soil acidification. In soil, urea hydrolyzes into ammonium ions, which undergo bacterial nitrification to produce nitrate. This microbiological process releases free hydrogen ions into the soil solution, progressively lowering soil pH, depleting basic cations like calcium and magnesium, and impairing subsoil health over extended cropping cycles.

98. (D) Eutrophication
Agricultural runoff carrying excessive synthetic fertilizers, rich in soluble nitrogen and phosphorus, enters nearby aquatic ecosystems, causing severe cultural eutrophication. Nutrient enrichment triggers rapid algal blooms that cover water surfaces, blocking sunlight. As dense algal biomass dies and undergoes bacterial decomposition, dissolved oxygen levels plunge dramatically, causing hypoxia, fish kills, and severe degradation of aquatic biodiversity.

99. (A) Soil Organic Carbon and microbial biomass
Exclusive reliance on chemical fertilizers without adding organic manures leads to a steady decline in soil organic carbon and beneficial microbial biomass. Organic carbon forms the structural

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foundation of soil aggregates and fuels biological activity. Depleting organic matter degrades soil physical structure, reduces water retention capacity, impairs nutrient cycling, and diminishes overall biological soil health over time.

100. (A) I and II only
Indiscriminate application of chemical fertilizers damages soil and water resources. High chemical salt concentrations disrupt physical soil aggregation, accelerating structural degradation and compaction. Additionally, excess nitrate fertilizers readily leach through soil profiles into underlying aquifers, causing groundwater contamination. High chemical inputs suppress earthworm and beneficial soil microbial populations rather than increasing their activity.

101. (A) Nitrogen
While the agronomic ideal recommended ratio for N:P:K consumption in Indian agriculture is generally four to two to one, actual fertilizer usage is heavily skewed toward nitrogenous inputs like urea. Significant government pricing subsidies on urea make nitrogen cheap relative to phosphorus and potassium, leading to imbalanced fertilization, low nutrient efficiency, and soil chemical degradation across intensive farming belts.

102. (D) Slow nitrogen release to boost efficiency and deter non-farm misuse
Mandatory neem-coating of urea slows the chemical nitrification process in soil. Bioactive triterpenes present in neem oil inhibit nitrifying bacteria, reducing rapid conversion of ammonium into leachable nitrate. This extends nitrogen availability for crop roots, enhances nitrogen use efficiency, minimizes environmental leaching and gaseous losses, and prevents illegal diversion of subsidized agricultural urea for non-agricultural industrial applications.

103. (B) Paramparagat Krishi Vikas Yojana (PKVY)
Paramparagat Krishi Vikas Yojana is a centrally sponsored scheme designed to promote organic farming across India. It adopts a cluster-based approach, encouraging farmer groups to adopt sustainable, eco-friendly agricultural practices without synthetic inputs. The scheme facilitates organic certification through the Participatory Guarantee System, supporting local marketing, improving soil health, and boosting farmers' income through premium organic produce sales.

104. (C) Earthworm digestion and excretion of organic waste
Vermicompost is a high-quality organic fertilizer produced through the breakdown of organic waste material by earthworm species, such as Eisenia fetida. Earthworms ingest plant residues and manure, breaking them down through gut digestion and microbial action. Their excretory castings are rich in humus, plant-available nutrients, beneficial microorganisms, and growth hormones that significantly improve soil fertility and structure.

105. (D) I, II, III, and IV
The International Federation of Organic Agriculture Movements defines four core principles governing organic agriculture globally. The Principle of Health emphasizes sustaining soil, plant, animal, and human health; Ecology advocates working within living ecological systems; Fairness stresses social equity and environmental justice; while Care mandates managing agricultural systems with precaution and responsibility to protect future generations.

106. (A) APEDA (Ministry of Commerce and Industry)
The National Programme for Organic Production establishes national standards and certification frameworks for organic products in India, particularly for export markets. This program is implemented under the administrative authority of the Agricultural and Processed Food Products Export Development Authority, under the Ministry of Commerce and Industry, ensuring international credibility, traceability, and quality assurance for certified organic exports.

107. (B) Jivamrita and Bijamrita formulations
Zero Budget Natural Farming relies on indigenous biological preparations to restore soil biology without chemical inputs. Jivamrita is a fermented microbial culture made from cow dung, urine, jaggery, and pulse flour that stimulates beneficial soil microflora. Bijamrita is a natural seed treatment formulation that protects germinating seedlings from soil-borne pathogens, accelerating root development and biological soil activation naturally.

108. (B) Mycorrhizae
Mycorrhizae represent mutualistic symbiotic associations formed between specialized soil fungi and plant root systems. Fungal hyphae extend

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far beyond the root absorption zone, creating an extensive network that increases surface area for mineral extraction. In return for plant carbohydrates, mycorrhizal fungi supply plants with insoluble phosphorus, micronutrients, and water, while enhancing soil aggregate stability and drought resilience.

109. (A) Suratgarh, Rajasthan
The Government of India launched the nationwide Soil Health Card Scheme in February 2015 from Suratgarh, Rajasthan. Operating under the slogan "Swasth Dharaa, Khet Haraa", this flagship scheme aims to assess soil nutrient status across farm holdings, providing farmers with crop-specific fertilizer recommendations to promote balanced nutrient application, lower input costs, and protect long-term soil health.

110. (A) 2, 4, 1, 3
Generating a Soil Health Card follows a structured sequence. Soil samples are initially collected from farm fields using a systematic GPS grid system. Samples are properly coded and transported to a soil testing laboratory for chemical analysis of twelve parameters. Finally, test results are uploaded to a digital portal to generate and print customized crop-wise fertilizer recommendation cards.

111. (C) 12
The Soil Health Card Scheme standardly tests twelve key soil parameters to assess chemical and physical fertility status. These parameters comprise physical indicators (pH, Electrical Conductivity, Organic Carbon), macronutrients (Nitrogen, Phosphorus, Potassium), secondary nutrients (Sulphur), and micronutrients (Zinc, Iron, Copper, Manganese, Boron). Testing these parameters helps guide balanced fertilizer applications customized to specific soil needs across farm plots.

112. (C) Guide deficiency-based fertilizer application to lower costs and degradation
A primary objective of the Soil Health Card scheme is to encourage scientific, site-specific nutrient management based on diagnosed soil deficiencies. By providing farmers with customized crop-wise recommendations, the scheme mitigates indiscriminate chemical fertilizer application, reduces cultivation costs, improves nutrient use efficiency, and prevents soil degradation caused by nutrient imbalances or over-fertilization across agricultural ecosystems.

113. (B) V-shaped cut down to 15 cm
Under the standard methodology of the Soil Health Card scheme, soil samples for arable crops are collected by digging a V-shaped cut down to fifteen centimeters depth. Soil slices are collected from the exposed side walls across multiple spot locations within a sampling grid, mixed thoroughly, and dried to obtain a representative composite sample for laboratory testing.

114. (D) Aluminum (Al)
Under the Soil Health Card scheme, twelve soil parameters are tested, including micronutrients such as zinc, iron, copper, manganese, and boron. Aluminum is not included among the tested micronutrients because it is not an essential plant nutrient; rather, soluble aluminum is a toxic element associated with highly acidic soils that restricts root elongation and crop development.

115. (B) III, I, II
Forest management initiatives in India evolved sequentially over recent decades. The National Commission on Agriculture officially recommended 'Social Forestry' in 1976 to meet rural wood and fodder needs. Subsequently, the Central Government introduced Joint Forest Management guidelines in 1990 to engage communities in forest conservation. Finally, the Scheduled Tribes and Other Traditional Forest Dwellers Act was enacted in 2006.

116. (C) National Commission on Agriculture (NCA)
The concept of 'Social Forestry' gained formal prominence in India through the landmark 1976 report of the National Commission on Agriculture. The commission advocated growing trees on non-forest lands, village commons, road margins, and agricultural borders to reduce human pressure on natural forests, meet rural demands for fuelwood, fodder, and small timber, and protect local topsoils.

117. (A) Farmers growing trees on private farmland for farm or commercial use
Farm forestry, a key branch of social forestry, refers to the practice of individual farmers growing commercial or multi-purpose tree species on their private agricultural land holdings. Trees are integrated along field boundaries, bunds, or fallow plots to generate farm timber, fuelwood,

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81. (B) Drainage divide
A drainage divide, or watershed boundary, is the elevated topographical boundary line separating adjacent drainage basins. Precipitation falling on opposite sides of a drainage divide flows into completely different stream networks and water outlets. Identifying these natural ridgelines is essential in watershed planning to establish precise spatial boundaries for land treatment and soil conservation interventions.

82. (D) Active participation and resource sharing by local villagers
The pioneer Sukhomajri watershed management project in Haryana demonstrated that sustainable soil and water conservation depends fundamentally on active community participation and equitable resource sharing. Establishing Hill Resource Management Societies engaged local villagers directly in protecting forest catchments, ending overgrazing, and sharing harvested irrigation water, transforming highly eroded badlands into fertile, productive, and resilient rural landscapes.

83. (B) Second-order stream
In Strahler's stream ordering system, unbranched headwater channels are classified as first-order streams. When two first-order streams intersect and merge, they form a second-order stream. Stream order increases only when two channels of the same order join. This hydrological classification enables researchers to systematically analyze stream network structure, flow volume, sediment transport, and watershed geomorphology.

84. (C) Zone of saturation (Phreatic zone)
The water table defines the upper surface boundary of the subsurface zone of saturation, or phreatic zone, where all rock fractures, sediment pores, and soil voids are completely filled with water under hydrostatic pressure. Above the water table lies the unsaturated vadose zone, where pore spaces contain both air and capillary water essential for plant roots.

85. (A) Between the land surface and water table
The vadose zone, or unsaturated zone, extends from the land surface down to the underlying water table. Within this subsurface region, soil pores contain a mixture of atmospheric gases and capillary water held by matric suction forces. It plays a key role in hydrology, controlling rainfall infiltration, soil moisture retention, groundwater recharge, and plant root uptake.

86. (D) Capillary fringe
The capillary fringe is the subsurface layer located directly above the water table where water is drawn upward into soil pores against gravity by surface tension and adhesive forces. The height of capillary rise depends on soil pore size distribution, rising significantly higher in fine-textured clay soils than in coarse sand, thereby supplying subsoil moisture to roots.

87. (B) It lowers the water table, uncoupling capillary supply from roots
Severe groundwater over-extraction lowers local water table levels, dropping the associated capillary fringe below the reach of plant root systems. In non-irrigated adjacent lands, this uncouples deep roots from underlying capillary water supplies. Consequently, surface topsoils dry out rapidly during rainless periods, reducing subsoil moisture availability, exacerbating plant drought stress, and accelerating localized land degradation.

88. (C) Baseflow
Baseflow represents the sustained, low-flow discharge of water entering stream channels, supplied continuously by long-term groundwater seepage from surrounding saturated aquifers. Unlike immediate surface runoff generated during precipitation events, baseflow sustains river flow during dry, rainless seasons, reflecting the hydrological connectivity between unconfined groundwater reservoirs, soil moisture levels, and surface stream networks within a watershed.

89. (D) Prolonged water saturation causing iron reduction in subsoil
Dark grey, greenish, or bluish mottled colors in subsurface soil profiles, known as gleying, indicate prolonged saturated and anaerobic soil conditions. When waterlogging displaces soil oxygen, anaerobic microorganisms reduce insoluble ferric iron compounds into soluble ferrous iron forms. This chemical reduction process strips typical reddish-brown iron coatings, leaving distinct grey gleyed horizons characteristic of hydric soils.

90. (A) P-2, Q-1, R-3, S-4
An aquifer is a permeable rock layer storing and yielding water. An aquiclude is an impermeable

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indigenous communities, women, and youth in land restoration initiatives, sustainable agriculture, soil moisture conservation, and climate adaptation projects to secure sustainable rural livelihoods.

127. (D) Avoid, reduce, and reverse land degradation
The response hierarchy for Land Degradation Neutrality provides a structured prioritization framework to guide land planning decisions. It prioritizes avoiding land degradation through land-use planning, reducing ongoing degradation by applying sustainable land management practices on active farmland, and reversing historical degradation through ecological restoration and rehabilitation of severely degraded soil ecosystems across landscapes.

128. (C) Nagpur
The National Bureau of Soil Survey and Land Use Planning is a premier research institute under the Indian Council of Agricultural Research, headquartered in Nagpur, Maharashtra. NBSS&LUP is responsible for conducting comprehensive soil surveys, preparing digital soil resource maps, evaluating land capability, and developing land-use planning models across various agro-ecological zones in India.

129. (B) 20
The National Bureau of Soil Survey and Land Use Planning systematically classified India into twenty major Agro-Ecological Regions. This classification integrates physiological features, soil characteristics, climatic parameters, ambient temperature, and length of crop growing period. These mapped regions provide a scientific framework for regional agricultural planning, crop suitability mapping, and sustainable land resource management nationwide.

130. (A) P-4, Q-1, R-2, S-3
ICAR institutes specialize in distinct land management research fields. Central Soil Salinity Research Institute is located in Karnal, Haryana. Indian Institute of Soil and Water Conservation is headquartered in Dehradun, Uttarakhand. Indian Institute of Soil Science operates in Bhopal, Madhya Pradesh, while Central Arid Zone Research Institute is situated in Jodhpur, Rajasthan.

131. (A) The United States Department of Agriculture (USDA)
The National Bureau of Soil Survey and Land Use Planning uses the USDA Soil Taxonomy classification system to survey and map soil resources in India. This hierarchical taxonomic framework categorizes soils into orders, suborders, great groups, subgroups, families, and series based on measurable diagnostic soil horizons, moisture regimes, temperature profiles, and mineralogical properties.

132. (C) Conducting soil surveys, mapping soil resources, and planning land use
A primary mandate of the National Bureau of Soil Survey and Land Use Planning is conducting systematic soil surveys and mapping soil resources across India at national, state, and district scales. The institute generates soil databases, evaluates land capability classes, and formulates scientific land-use options to optimize agricultural production while preserving land resources against degradation.

133. (A) Arable lands fit for cultivation with suitable conservation measures
In standard Land Capability Classification systems, lands are grouped into eight capability classes based on soil limitations and erosion hazards. Classes I through IV are classified as arable lands suitable for sustained agricultural crop production. Class I requires minimal conservation practices, while Classes II, III, and IV require progressively intensive soil and water conservation measures to prevent degradation.

134. (D) Watershed Development Component (WDC)
The Watershed Development Component of Pradhan Mantri Krishi Sinchayee Yojana focuses on comprehensive soil and water conservation across rainfed areas. It implements ridge area treatments, contour bunding, gully control structures, drainage line treatments, and rainwater harvesting ponds. These interventions reduce surface erosion, increase topsoil moisture retention, restore degraded lands, and enhance groundwater recharge within watershed units.

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135. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
The National Mission for Sustainable Agriculture aims to enhance climate resilience in Indian agriculture by promoting integrated farming systems and soil health management.

and additional revenue, while simultaneously reducing wind erosion and improving subsoil organic carbon levels.

118. (D) Planting trees on village common lands to cut runoff and yield fuel/fodder
Community forestry involves planting multi-purpose tree species on common village land through collective community participation. This social forestry component creates green cover that intercept rainfall, cuts surface runoff velocity, and minimizes topsoil erosion. Simultaneously, it provides sustainable yields of fuelwood, fodder, and timber to local households, alleviating pressure on adjacent natural forest ecosystems and improving soil moisture.

119. (B) Eucalyptus (Eucalyptus tereticornis)
During early social forestry programs in India, Eucalyptus tereticornis was extensively planted due to its rapid growth and timber market value. However, ecologists criticized its widespread adoption because its deep roots extract high volumes of soil moisture, lowering local water tables. Additionally, Eucalyptus releases allelopathic chemical compounds that suppress understory ground vegetation, leaving surface topsoils vulnerable to erosion.

120. (A) I and II only
Agroforestry systems integrate deep-rooted trees with annual agricultural crops, providing significant environmental benefits. Deep tree roots draw mineral nutrients from subsoil horizons and deposit them on the surface through leaf litter fall, enhancing topsoil organic carbon and moisture retention. Agroforestry increases overall land equivalent ratios and total biomass production per unit area rather than reducing agricultural output.

121. (D) Village communities organized into Forest Committees
Joint Forest Management is based on a co-management partnership between state forest departments and local village communities organized into Joint Forest Management Committees. In exchange for protecting nearby degraded forests from illegal logging, overgrazing, and fires, community members receive non-timber forest products and a share of timber harvest revenues, fostering community-led sustainable forest and soil conservation.

122. (D) SDG 15 (Life on Land)
Land Degradation Neutrality is a central target embedded within Sustainable Development Goal 15, specifically Target 15.3, set by the United Nations. This target mandates combating desertification, restoring degraded land and soil—including land affected by desertification, drought, and floods—and striving to achieve a land-degradation-neutral world by 2030 to protect terrestrial ecosystems and global food security.

123. (B) Land resources for ecosystem function and food security remain stable or grow
The UNCCD defines Land Degradation Neutrality as a state whereby the amount and quality of land resources necessary to support ecosystem functions and services and enhance food security remain stable or increase within specified temporal and spatial scales. LDN seeks to balance ongoing land degradation with active land restoration and sustainable land management strategies nationwide.

124. (D) 26 million hectares
During the 14th Conference of Parties to the UNCCD held in New Delhi in 2019, India increased its national land restoration commitment under the Bonn Challenge. India raised its target from twenty-one million to twenty-six million hectares of degraded and deforested land to be restored by 2030, emphasizing sustainable land management, soil health, and biodiversity conservation.

125. (A) I, II, and III only
To assess progress toward Land Degradation Neutrality, the UNCCD tracks three global progress indicators: land cover changes, land productivity trends, and soil organic carbon stocks above and below ground. These combined metrics evaluate landscape condition, biological productivity, and topsoil health over time, excluding human demographic changes, to guide land restoration policy and environmental monitoring.

126. (C) Community participation involving local people, women, and youth in restoration
The Delhi Declaration, adopted at UNCCD COP14 in 2019, underscored transformative land management strategies to achieve Land Degradation Neutrality. It placed strong emphasis on inclusive community-driven approaches, actively involving local populations,

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144. (C) The surface receiving rainfall and supplying water to the system
In rainwater harvesting systems, the catchment area is defined as the surface that directly receives rainfall and funnels the resulting runoff into collection channels and storage structures. Catchments can include paved courtyards, paved roads, natural land slopes, or rooftops, with surface smoothness and slope angle determining total runoff volume and collection efficiency.

145. (A) I, II, and III only
Rainwater harvesting delivers notable benefits for soil and groundwater regimes. Infiltrating fresh rainwater dilutes underground contaminant concentrations, including fluorides and nitrates. In coastal aquifers, artificial recharge builds hydraulic pressure that deters seawater intrusion. Additionally, percolation enhances soil moisture within the unsaturated vadose zone while reducing surface water erosion when structures are properly constructed.

146. (D) Zabo
Zabo is an indigenous, integrated rainwater harvesting system practiced in Nagaland, particularly in Kikruma village. Combining forestry, water management, and agriculture, this traditional method collects monsoonal runoff from protected hilltop forests into excavated storage ponds. The harvested water is then channeled downward to irrigate terraced paddy fields while supplying drinking water for livestock.

147. (A) Ministry of Environment, Forest and Climate Change (MoEFCC)
The Ministry of Environment, Forest and Climate Change serves as the nodal ministry for implementing the UNCCD in India. MoEFCC coordinates national strategies, policies, and reporting frameworks to combat desertification, land degradation, and drought. It oversees the implementation of National Action Plans, promotes sustainable land management practices, and coordinates multi-sectoral land restoration initiatives nationwide.

148. (C) Rajasthan
According to the Desertification and Land Degradation Atlas of India published by ISRO's Space Applications Centre, Rajasthan accounts for the highest area under land degradation and desertification in India. High atmospheric aridity, hyper-arid soil conditions, active wind erosion, sparse vegetative cover, and continuous overgrazing contribute to extensive land degradation across the state's western drylands.

149. (A) Kutch to Panipat along the Aravalli range
The proposed Great Green Wall of India is a conceptual environmental initiative designed to combat desertification. It envisions creating a continuous, multi-kilometer-wide green ecological corridor extending from Porbandar and Kutch in Gujarat to Panipat in Haryana along the degraded Aravalli range. This green belt aims to reduce wind erosion, block advancing desert sands, and restore topsoils.

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150. (D) Water erosion
According to ISRO's Desertification and Land Degradation Atlas, water erosion is identified as the single largest process driving land degradation in India, affecting over ten percent of the country's total geographical area. Uncontrolled surface runoff dislodges fertile topsoil, leading to sheet, rill, and gully erosion across diverse agricultural landscapes, river catchments, and sloping terrains nationwide.

151. (B) Restore degraded and deforested landscapes
The Bonn Challenge is a global initiative aimed at restoring degraded and deforested landscapes worldwide. Under this framework, India pledged to restore twenty-six million hectares of degraded land by 2030. Participating in this challenge helps India enhance soil organic carbon, rehabilitate degraded forests, improve watershed hydrology, support biodiversity, and build climate resilience across vulnerable rural ecosystems.

152. (C) Promoting shifting cultivation on vulnerable slopes
India's National Action Plan to Combat Desertification excludes promoting shifting cultivation on steep slopes, as slash-and-burn practices accelerate topsoil loss and land degradation. Instead, the strategy focuses on afforestation, sustainable agricultural practices, soil and water conservation, drought early-warning systems, and community-led natural resource management to rehabilitate degraded dryland ecosystems and restore land productivity.

153. (D) Salt-affected due to poor drainage and evaporation
Usar soils in the Indo-Gangetic plains of Uttar Pradesh are salt-affected lands formed under arid or semi-arid conditions with poor internal drainage. High water tables coupled with intense surface evaporation draw dissolved salts upward via capillary action. Accumulating sodium ions degrade soil physical structure, elevate pH and exchangeable sodium percentage, and render topsoils highly alkaline and unsuited for crops.

154. (A) Agra, Etawah, and Jalaun along Chambal-Yamuna rivers
Severe gully erosion resulting in vast ravine networks is prominent along the Chambal and Yamuna river basins in western Uttar Pradesh, particularly across Agra, Etawah, and Jalaun districts. Monsoonal surface runoff cuts deeply into soft alluvial deposits, forming rugged, deeply dissected badlands that destroy productive agricultural soils and require specialized bio-engineering and soil conservation measures to restore stability.

155. (B) Waterlogging and secondary salinization
The introduction of canal networks like the Sharda Sahayak system in flat plains lacking adequate drainage caused waterlogging. Excessive canal seepage raised groundwater tables to the root zone. Under high summer evaporation, dissolved salts accumulated in topsoil through capillary action, inducing secondary salinization and Usar formation, which degraded fertile alluvial farmlands across Central Uttar Pradesh.

156. (B) High water table and poor drainage causing seasonal waterlogging
The Terai region of Uttar Pradesh, situated along the Himalayan foothills, is characterized by a high water table, heavy seasonal rainfall, and clayey alluvial soils with poor internal drainage. These environmental factors lead to widespread seasonal waterlogging and subsoil saturation, which restrict crop root respiration, hinder land tillage operations, and require specialized field drainage systems.

157. (A) Excessive groundwater pumping for crops like sugarcane and paddy
Western Uttar Pradesh faces severe challenges in soil moisture and water management due to intensive groundwater extraction for water-demanding crops like sugarcane and paddy. Over-pumping tube wells lowers water tables, uncoupling upper root zones from subsoil capillary supply during dry periods, exacerbating subsoil drying, lowering crop drought resilience, and accelerating groundwater depletion across major farming belts.

158. (C) Removing fertile agricultural topsoil for brick production
The proliferation of brick kilns across fertile plains negatively affects soil conservation by excavating organic topsoil for brick manufacturing. Stripping topsoil removes the nutrient-rich, biologically active upper horizon, exposing infertile subsoils. This practice reduces agricultural land productivity, impairs soil moisture retention, degrades physical soil structure, and accelerates land degradation across rural agricultural districts.

159. (D) Growing different crops in planned sequence on the same land over time
Crop rotation is an agronomic conservation practice involving the systematic growing of different crop species in a planned sequence on the same land area over successive seasons. Rotating deep-rooted and shallow-rooted crops, along with legumes, improves soil physical structure, maintains balanced nutrient uptake, suppresses soil-borne pests and diseases, and enhances overall soil organic carbon levels over time.

160. (A) P-2, Q-1, R-4, S-3
Legumes fix atmospheric nitrogen, enhancing soil fertility naturally. Alternating rooting depths prevents nutrient extraction from the exact same soil layer. Monsoon cover crops protect bare soil from raindrop impact and splash erosion, while rotating non-host crops interrupts life cycles of soil-borne pests and pathogens, maintaining aggregate stability and biological soil health across agricultural fields.

161. (B) Fix atmospheric nitrogen in soil via Rhizobium symbiosis
Incorporating pulse crops into crop rotations in northern India enhances soil fertility naturally. Pulses establish a symbiotic relationship with Rhizobium bacteria housed within their root nodules, fixing atmospheric nitrogen gas into plant-available soil ammonium. This biological nitrogen fixation enriches the soil, reduces synthetic fertilizer requirements for subsequent

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cereal crops, and enhances soil organic carbon content.

162. (D) It degrades aggregate stability and depletes specific soil nutrients
Continuous monoculture negatively affects physical and chemical soil properties over extended periods. Growing the same crop repeatedly extracts specific nutrient fractions from the same soil depth, causing localized nutrient depletion. Additionally, uniform root architecture and tillage practices break down soil aggregates, reduce organic carbon inputs, compact topsoils, and increase susceptibility to erosion and pest infestation.

163. (A) Forming dense root networks that bind soil aggregates against water erosion
Incorporating fibrous-rooted cereal crops, such as wheat or maize, into crop rotations contributes to soil conservation. Their extensive, finely branched root systems permeate topsoil layers, physically binding soil particles into stable aggregates. These root networks reinforce topsoil cohesion, improve water infiltration rates, enhance organic matter accumulation, and protect farmlands against erosion caused by surface runoff flow.

164. (C) Retaining crop residues and sowing directly without soil disturbance
Zero Tillage is a key conservation agriculture practice where crops are sown directly into undisturbed soil containing previous crop residues. Omitting primary and secondary tillage preserves natural soil aggregate structure, retains crop residue mulches that suppress evaporation, enhances water infiltration, builds soil organic carbon, and reduces soil erosion while lowering fuel and operational costs for farmers.

165. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Drip irrigation conserves soil moisture and manages salinity in arid environments. Delivering water directly to crop root zones minimizes evaporative losses compared to surface flooding. Furthermore, localized frequent wetting maintains high matric potential in root zones, driving soluble salts outward toward the periphery of the wetted bulb, thereby protecting sensitive crop roots from salt toxicity.

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166. (D) Suppress weed growth and reduce topsoil moisture evaporation
Plastic mulching involves covering soil beds with polyethylene sheets prior to planting. In modern horticultural production, black plastic film creates a physical barrier that intercepts solar radiation, suppressing weed seed germination beneath the cover. Furthermore, plastic mulches prevent topsoil moisture evaporation, maintain uniform subsoil temperatures, improve crop water-use efficiency, and protect fruit quality from soil contact.

167. (B) Applying dissolved fertilizers directly to root zones via drip irrigation
Fertigation is an advanced agricultural technique that combines irrigation and fertilization by injecting water-soluble fertilizers directly into drip irrigation lines. This precise application method delivers nutrients directly into the active plant root zone at controlled rates, maximizing nutrient absorption efficiency, minimizing fertilizer leaching into subsoils, conserving water, and reducing overall chemical input requirements in field crops.

168. (D) I, II, and III
Zero Tillage farming provides distinct economic and environmental advantages. Omitting mechanical land preparation preserves soil aggregate structure and reduces runoff erosion. Retaining crop residues on field surfaces enhances topsoil moisture retention and organic matter accumulation. Additionally, eliminating multiple ploughing passes substantially reduces diesel fuel consumption, machinery wear, labor requirements, and overall production costs for farmers.

169. (A) I, II, and IV only
Agricultural hydrogels are superabsorbent cross-linked polymers mixed into soil. Upon absorbing rainfall or irrigation water, they swell to store water multi-fold their dry weight, gradually releasing moisture to plant roots during dry spells. Their swelling and shrinking cycles improve soil aeration and porosity, reducing irrigation frequency and surface runoff without altering fundamental soil textural classifications.

170. (A) Buries driplines to minimize surface evaporation and weed growth
Subsurface Drip Irrigation involves placing drip lines beneath the soil surface within the active

58. Identify the correct statement regarding industrial forestry.
(A) It focuses on intensive management practices to maximize yield per unit area.
(B) It relies exclusively on slow-growing native species with a rotation cycle of over 100 years.
(C) It strictly forbids the use of improved genetic planting material or clones.
(D) It is only practiced by the government on reserved forest lands.

59. A significant criticism of large-scale industrial forestry using exotic species like Eucalyptus is that it may lead to which of the following?
(A) Rapid long-term enhancement of regional soil moisture levels and underground water recharge
(B) Groundwater depletion and loss of biodiversity from monoculture
(C) A marked increase in the population density of local avifauna and native insect species
(D) Significant improvement in traditional agricultural crop yields on immediately adjacent farmlands

60. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): Industrial plantations often utilize clonal forestry techniques.
Reason (R): Clonal plants ensure genetic uniformity, resulting in uniform growth, higher yield, and easier harvesting.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

61. Under the concept of farm forestry, who is primarily responsible for planting and managing trees?
(A) Farmers planting on their private lands or farm boundaries
(B) The State Forest Department executing government projects on public reserved lands
(C) Private commercial corporations establishing timber plantations on leased degraded land
(D) Municipal corporations maintaining ornamental vegetation in urban parks and public gardens

62. Which of the following is a common practice in farm forestry?
(A) Handing over farm ownership to the state for afforestation
(B) Cultivating only annual vegetable crops without any perennial vegetation
(C) Growing timber trees on the bunds and boundaries of agricultural fields
(D) Clearing primary forests to create new farms

63. How does farm forestry differ from traditional agro-forestry?
(A) Farm forestry is strictly practiced in urban municipal zones, whereas agroforestry is practiced exclusively in remote rural agrarian regions.
(B) Farm forestry exclusively utilizes introduced exotic tree species, whereas traditional agroforestry relies solely on indigenous native species.
(C) There is no structural difference; both forestry management terms are used completely synonymously across legal and academic contexts.
(D) Agroforestry integrates trees with crops/ livestock, while farm forestry can focus solely on commercial trees.

64. A farmer deciding to convert a marginally productive patch of his land entirely into a Casuarina plantation for pole production is engaging in:
(A) Strip cropping
(B) Shifting cultivation
(C) Farm forestry
(D) Contour farming

65. Which factor has historically been a significant barrier to the expansion of farm forestry in several Indian states?
(A) Persistent excessive rainfall leading to chronic soil waterlogging of nearly all cultivated tree species
(B) Cumbersome felling and transit permit regulations for private timber
(C) The total absence of functional wood-based processing industries across northern Indian states
(D) The inherently toxic biological nature of indigenous tree species affecting neighboring agricultural crops

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CHAPTER 07
Afforestation and Agroforestry

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1. Which of the following best defines afforestation in the context of environmental science?
(A) The natural regeneration of a forest after a wildfire or logging event
(B) The establishment of a forest or stand of trees in an area where there was no previous tree cover
(C) The process of replacing exotic tree species with native tree species in a degraded forest
(D) The systematic harvesting of mature trees to allow sunlight to reach the forest floor

2. The primary objective of planting trees on lands that have historically not contained forests is to create a new carbon sink and stabilize soil. This specific process is scientifically termed as which of the following?
(A) Silviculture
(B) Deforestation
(C) Reforestation
(D) Afforestation

3. In the context of establishing forests in new areas, which of the following is considered the most critical initial step before selecting tree species?
(A) Conducting a comprehensive soil and climate suitability analysis
(B) Constructing a large-scale timber processing unit nearby
(C) Introducing exotic wildlife to the barren land
(D) Applying high-concentration chemical fertilizers across the entire area

4. Which of the following statements identifies an incorrect practice during the process of establishing forests in new geographic areas?
(A) Creating micro-catchments to harvest rainwater for sapling survival
(B) Testing soil pH and nutrient levels to match species requirements
(C) Prioritizing monoculture plantations of water-intensive exotic species in arid regions
(D) Utilizing native pioneer species to initially stabilize the soil structure

5. The restoration of degraded forests differs from afforestation primarily because restoration focuses on which of the following?
(A) Restoring the structure and function of a previously existing forest
(B) Converting active agricultural land into commercial timber plantations
(C) Introducing genetically modified trees into natural pristine grasslands
(D) Clearing native old-growth forests to cultivate commercial timber trees

6. What is the fundamental definition of reforestation as recognized by international environmental frameworks?
(A) Planting trees in urban residential areas to reduce pollution
(B) The establishment of a forest on land that has been without forest for over fifty years
(C) Harvesting non-timber forest products without cutting down the trees
(D) The replanting of trees in areas that have been deforested or recently degraded

7. When a forest department initiates a project to replant trees in a region of the Terai that was cleared for agriculture ten years ago, this project is technically an example of which of the following?
(A) Afforestation
(B) Reforestation
(C) Agro-forestry
(D) Urban forestry

8. Which of the following is the most appropriate method for restoring a degraded forest that has lost its topsoil due to severe erosion?
(A) Immediate planting of sensitive climax forest tree species requiring deep fertile topsoil
(B) Introduction of dense grazing livestock to systematically improve soil fertility via manure
(C) Planting pioneer grasses and nitrogen-fixing shrubs prior to trees
(D) Paving the eroded land surface to prevent further erosion before planting large tree

Planting and sowing → Maintenance and pruning → Land preparation

26. What is a primary economic benefit that farmers gain by adopting agro-forestry?
(A) Diversification of income sources and reduced risk of total crop failure
(B) Complete elimination of agricultural labor costs
(C) Increased dependency on chemical fertilizers due to soil depletion
(D) Immediate return on investment within the first two months of planting trees

27. How does agro-forestry contribute to the ecological benefit of soil conservation?
(A) Tree roots destabilize topsoil structure, directly accelerating wind and water erosion.
(B) Canopy breaks rainfall impact while roots bind soil against erosion.
(C) Trees extract all ground moisture, rendering soil desiccated and hostile to weed growth.
(D) Fallen organic leaves release toxic compounds, preventing beneficial bacteria from surviving.

28. Which of the following is a major ecological advantage of integrating leguminous trees in an agro-forestry system?
(A) They deplete soil nitrogen, preventing weeds from growing.
(B) They fix atmospheric nitrogen, enhancing soil fertility naturally.
(C) They grow extremely slow, ensuring crops get all sunlight for decades.
(D) They secrete chemicals that permanently sterilize the surrounding soil.

29. Identify the incorrect statement regarding the benefits of agro-forestry.
(A) It maximizes monoculture yield by eliminating competition.
(B) It creates a beneficial micro-climate that supports shade-tolerant understory crops.
(C) It contributes significantly to long-term carbon sequestration and climate change mitigation.
(D) It supplies dependable alternative fodder for farm livestock throughout dry drought seasons.

30. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): Agro-forestry systems generally exhibit higher total biomass production per unit area compared to sole cropping systems.
Reason (R): Trees and crops in agro-forestry exploit different soil depths and canopy strata, leading to more efficient use of resources like water, nutrients, and sunlight.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

31. Which massive tree plantation drive is celebrated annually in India in the first week of July to encourage citizens to plant trees?
(A) Swachh Bharat Abhiyan
(B) Project Tiger
(C) Harit Kranti
(D) Van Mahotsav

32. In recent years, state governments have launched massive single-day plantation drives. What is the primary purpose of involving various government departments, NGOs, and the public in these drives?
(A) To strictly enforce restrictive regulations of the Indian Forest Act on private lands
(B) To ensure maximum survival rates of specialized exotic timber plantations meant for export
(C) To generate public awareness and rapidly expand state green cover
(D) To systematically clear existing natural forests to facilitate infrastructure projects

33. The 'Nagar Van' (Urban Forest) scheme launched by the Government of India aims to create how many urban forests across the country to improve the urban environment?
(A) 50
(B) 200
(C) 100
(D) 1000

34. Under various government schemes promoting afforestation, financial assistance is often provided to farmers for planting trees on their land. Which scheme focuses heavily on creating assets like plantations through rural wage employment?
(A) PM-Kisan
(B) PM-JAY

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16. The concept of social forestry in India was officially recognized and heavily promoted based on the recommendations of which of the following commissions?
(A) The Education Commission chaired by Kothari (1964)
(B) The Backward Classes Commission chaired by Mandal (1979)
(C) The National Commission on Agriculture (1976)
(D) The Centre-State Relations Sarkaria Commission (1983)

17. Which of the following is not a main component of Social Forestry as categorized in India?
(A) Private agricultural farm forestry initiatives
(B) Commercial clear-felling forestry
(C) Village-level community forestry projects
(D) Public infrastructure extension forestry

18. Under community forestry, the management and benefits of the planted trees on village common lands primarily belong to which entity?
(A) The executive branch of the Central Government
(B) Large private multinational timber corporations
(C) Non-governmental international environmental organizations
(D) The local community or Gram Panchayat

19. What does the term extension forestry specifically entail within the social forestry framework?
(A) Planting trees on the sides of roads, canals, and railways, and on wastelands
(B) Extending the boundaries of existing National Parks by acquiring private land
(C) Extending the harvest period of timber to maximize trunk girth
(D) Removing trees from agricultural fields to extend crop areas

20. Consider the following statements regarding the objectives of social forestry:
I. It aims to meet the local needs for fuelwood, fodder, and small timber.
II. It helps in reducing pressure on traditional forest areas.
III. It prohibits the participation of local farmers and relies solely on forest officials.
IV. It utilizes unused and fallow lands to increase total tree cover.
Which of the above statement(s) is/are correct?
(A) I, II and III only
(B) I, II and IV only
(C) II, III and IV only
(D) I, III and IV only

21. Agro-forestry is best defined as a land-use management system that involves which of the following?
(A) Integrating trees with crops or livestock on the same land unit
(B) The exclusive mechanized cultivation of annual agricultural food crops
(C) The systematic clearing of native forests to establish commercial grazing pastures
(D) The intensive commercial cultivation of aquatic plants in controlled greenhouse environments

22. In agro-forestry, the system where trees are grown in association with agricultural crops is scientifically known as what?
(A) Comprehensive silvopastoral system
(B) Integrated agrosilvopastoral system
(C) Commercial apiculture management system
(D) Agrisilvicultural system

23. Which of the following agro-forestry systems integrates trees, agricultural crops, and pasture/animals together on the same piece of land?
(A) Specialized agrisilvicultural system
(B) Agrosilvopastoral system
(C) Traditional silvopastoral land system
(D) Integrated hortipastoral management system

24. A farmer grows Poplar trees along the boundaries of a wheat field. This practice is an example of which type of agro-forestry?
(A) Systematic alley cropping
(B) Integrated silvopasture management
(C) Boundary plantation
(D) Traditional Taungya cultivation system

25. Select the correct sequence of steps generally followed in establishing a successful agro-forestry model on degraded land:
(A) Selection of tree/crop combinations → Land preparation → Planting and sowing → Maintenance and pruning
(B) Land preparation → Maintenance and pruning → Selection of tree/crop combinations → Planting and sowing
(C) Planting and sowing → Selection of tree/crop combinations → Land preparation → Maintenance and pruning
(D) Selection of tree/crop combinations →

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root zone. In hot arid climates, SDI is superior to surface drip because burying emitters prevents direct water exposure to high atmospheric temperatures, eliminating surface evaporation. Additionally, keeping the soil surface dry suppresses weed germination, reduces disease pressure, and optimizes water use efficiency.

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(C) PM-SYMY
(D) MGNREGA

35. Identify the correct pair of a tree plantation initiative and its core objective.
(A) Namami Gange Afforestation - Planting trees along Ganga banks to curb erosion and pollution
(B) Green India Mission - Exclusively promoting urban rooftop gardening initiatives across metropolitan cities
(C) Nagar Van Scheme - Developing large-scale commercial timber plantations in remote rural regions
(D) CAMPA - Directly distributing chemical fertilizers and equipment to traditional agricultural farmers

36. Which of the following is a key goal of the Uttar Pradesh state government regarding its forest and tree cover?
(A) To reduce the tree cover to make way for the expanding real estate sector
(B) To completely replace native forests with commercial Eucalyptus plantations by 2025
(C) To increase the state's forest and tree cover to 15 percent by the year 2030
(D) To hand over all protected areas to private industries for maintenance

37. To achieve its afforestation targets, the Uttar Pradesh Forest Department heavily relies on the "Vriksharopan Jan Andolan". Which of the following best describes this strategy?
(A) A mass movement engaging citizens, farmers, local bodies, and government departments
(B) A restrictive top-down administrative strategy where only uniformed forest officials plant trees in reserved forests
(C) An international exchange initiative where foreign laborers are brought in to plant trees on state barren lands
(D) A policy relying exclusively on unmonitored aerial seeding across dry desert regions without ground follow-up

38. In the context of the Uttar Pradesh Afforestation Policy, why is the planting of Peepal, Banyan, and Neem trees specifically encouraged?
(A) They represent fast-growing exotic timber species that yield exceptionally high-value commercial wood.
(B) Their foliage is harvested on an industrial scale primarily for manufacturing synthetic rubber products.
(C) They exhibit zero water requirements and possess the unique capacity to grow directly on concrete.
(D) They hold cultural and medicinal value while purifying air.

39. Which of the following strategies is heavily emphasized to ensure the survival of saplings planted during massive drives?
(A) Leaving newly planted saplings entirely dependent on natural rainfall without physical protection
(B) Geotagging saplings and monitoring via mobile applications
(C) Applying potent chemical defoliants to eliminate all potential insect attacks during the first year
(D) Exclusively transplanting mature, fully grown trees harvested and transported from neighboring states

40. Consider the following statements regarding the implementation strategy of afforestation in Uttar Pradesh:
I. Saplings are distributed free or at nominal costs to citizens and farmers through government nurseries.
II. The strategy strictly avoids planting fruit-bearing trees to prevent wildlife conflicts in villages.
III. Smriti Vatikas (memorial gardens) and Navagraha Vatikas are established to connect plantation with cultural sentiments.
Which of the above statement(s) is/are correct?
(A) I and II only
(B) I and III only
(C) II and III only
(D) I, II and III

41. What is the full form of CAMPA, an authority established to promote afforestation and regeneration activities?
(A) Central Afforestation Management and Plantation Agency
(B) Committee for Agriculture, Moisture and Plantation Assessment
(C) Compensatory Agriculture and Maintenance Project Authority
(D) Compensatory Afforestation Fund Management and Planning Authority

42. The funds collected under CAMPA are primarily sourced from which of the following activities?

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(A) Levies on user agencies for diverting forest land to non-forest uses
(B) Voluntary financial contributions collected from international environmental charities and trusts
(C) Fines and penalties systematically imposed on individuals convicted of illegal wildlife poaching
(D) A designated national income tax surcharge levied on all income-tax-paying citizens of India

43. According to the Compensatory Afforestation Fund Act, 2016, what is the ratio of fund distribution between the State CAMPA and the National CAMPA?
(A) 50% to State, 50% to National
(B) 90% to State, 10% to National
(C) 70% to State, 30% to National
(D) 10% to State, 90% to National

44. Which of the following activities is NOT a permitted use of CAMPA funds?
(A) Assisted natural ecosystem regeneration and intensive artificial forest regeneration activities
(B) Salaries, allowances, and travel expenses of regular forest staff
(C) Wildlife protection infrastructure and habitat management inside established protected areas
(D) Comprehensive forest fire prevention, early detection, and emergency control operations

45. Match the fund or scheme in List I with its primary purpose in List II.
List I: (Fund/Scheme)
P. CAMPA Fund
Q. Green India Mission
R. Nagar Van Scheme
S. MGNREGA Plantation
List II: (Primary Purpose)
1. Improving green cover in urban municipalities
2. Generating rural employment through asset creation like plantations
3. Enhancing carbon sinks and adapting to climate change under NAPCC
4. Compensating for the loss of forest land diverted for infrastructure
(A) P-4, Q-3, R-1, S-2
(B) P-3, Q-4, R-2, S-1
(C) P-4, Q-1, R-3, S-2
(D) P-2, Q-3, R-1, S-4

46. The Green India Mission (GIM) is one of the eight core missions outlined under which broader national framework?
(A) National Targets for Biodiversity Conservation
(B) Swachh Bharat Mission Urban and Rural Framework
(C) National Action Plan on Climate Change (NAPCC)
(D) National Comprehensive Disaster Management Plan

47. A major quantitative objective of the Green India Mission is to increase forest/tree cover by how many hectares, along with improving the quality of forest cover on an equal area?
(A) 1 million hectares
(B) 2 million hectares
(C) 10 million hectares
(D) 5 million hectares

48. How does the Green India Mission aim to contribute to the socio-economic wellbeing of local communities?
(A) By systematically evicting indigenous tribal populations from all designated forest fringe areas
(B) By strictly prohibiting local communities from collecting any non-timber minor forest produce
(C) By boosting forest livelihood income for 3 million households
(D) By converting legally designated community forests into private commercial industrial estates

49. Which of the following is considered an ecological objective of the Green India Mission?
(A) Artificially reducing atmospheric oxygen levels in dense forest zones to eliminate fire hazards
(B) Sequestering 50 to 60 million tonnes of carbon annually
(C) Systematically replacing naturally diverse mixed forests with commercial teak monocultures
(D) Engineering river diversions to permanently and artificially submerge natural forest regions

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50. Consider the following statements regarding the Green India Mission (GIM):
I. GIM targets the improvement of ecosystem services, including biodiversity and

hydrological services.
II. GIM adopts a landscape-based approach rather than just focusing on political or administrative boundaries.
III. Local level implementation is strictly handled by the Central Armed Police Forces.
IV. Gram Sabhas and Joint Forest Management Committees play a crucial role in its implementation.

Which of the above statement(s) is/are correct?
(A) I, II and III only
(B) I, II and IV only
(C) II, III and IV only
(D) I, III and IV only

51. The success of community afforestation programmes largely depends on the active participation of local institutions. In India, which entity is formally constituted to manage and protect community forests in collaboration with the Forest Department?
(A) Joint Forest Management Committee (JFMC)
(B) District Consumer Forum
(C) Agriculture Produce Market Committee (APMC)
(D) State Finance Commission

52. The concept of Joint Forest Management (JFM) originated primarily to address which of the following issues?
(A) The urgent national requirement for expanding large-scale commercial timber exports to foreign nations
(B) The persistent political demand for converting reserved forest lands into permanent agricultural farmlands
(C) Failure of strict policing alone and the need for local community involvement
(D) The administrative requirement to permanently relocate all indigenous tribal populations to urban centers

53. In a typical community afforestation model, what is the benefit-sharing mechanism?
(A) Members receive non-timber forest produce and a portion of final timber harvest revenue.
(B) The community retains 100% of commercial timber sales profits while the state collects all minor produce.
(C) All generated revenue is transferred directly to the Central Government without local benefit distribution.
(D) The local community pays mandatory annual fees to the state for the privilege of guarding local forests.

54. Which of the following local participatory institutions is specifically empowered under the Forest Rights Act (FRA), 2006 to protect, regenerate, or conserve community forest resources?
(A) Zila Parishad
(B) Block Development Council
(C) State Wildlife Board
(D) Gram Sabha

55. Consider the following steps in establishing a Joint Forest Management (JFM) project in a village:
I. Signing of MoU between the JFMC and the Forest Department
II. Micro-planning and identifying the degraded forest patch
III. Constitution of the Joint Forest Management Committee by the village assembly
IV. Execution of afforestation and protection activities

Which of the following represents the correct logical sequence?
(A) III, I, II, IV
(B) II, III, I, IV
(C) III, II, I, IV
(D) I, III, II, IV

56. Industrial forestry primarily involves raising plantations of specific tree species with what main objective?
(A) Creating protected, highly diverse ecological habitats specifically for endangered native wildlife species
(B) Environmental reclamation of severely degraded industrial lands contaminated with toxic heavy metals
(C) Supplying industrial raw materials for paper, pulp, and timber industries
(D) Providing free fuelwood, fodder, and small timber resources exclusively to local marginalized communities

57. Which of the following tree species is most commonly planted in India under industrial forestry for the pulp and paper industry?
(A) Banyan (Ficus benghalensis)
(B) Sal (Shorea robusta)
(C) Peepal (Ficus religiosa)
(D) Eucalyptus

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saplings

9. Identify the incorrect statement regarding the ecological restoration of degraded forests.
(A) Restoration aims to comprehensively bring back the full original biodiversity of the area.
(B) Natural regeneration can be a part of the restoration process if rootstocks are still viable.
(C) Soil and moisture conservation works are routinely required alongside planting activities.
(D) Restoration requires exotic timber species to completely replace native flora.

10. Consider the following statements regarding the difference between afforestation and reforestation:
I. Afforestation is done on land that was not recently forested, whereas reforestation is done on recently deforested land.
II. Both afforestation and reforestation contribute to carbon sequestration and climate change mitigation.
III. Reforestation always involves planting exotic species to ensure faster growth than the original forest.
Which of the above statement(s) is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II and III

11. Based on the objective and area, how does afforestation typically contrast with reforestation under the Kyoto Protocol mechanisms?
(A) Afforestation is strictly performed for industrial timber production, while reforestation is exclusively dedicated to wildlife habitat conservation.
(B) Afforestation applies to land un-forested for 50+ years; reforestation applies to land deforested since 1990.
(C) Afforestation exclusively applies to degraded wetland ecosystems, while reforestation applies strictly to dryland and arid geographic zones.
(D) There is no formal technical distinction between the terms; both are used completely interchangeably across international environmental legal frameworks.

12. If a project plans to plant trees on the barren ravines of the Chambal region where no forest existed in recorded history, which specific term applies to this project?
(A) Reforestation
(B) Afforestation
(C) Silvopasture
(D) Taungya system

13. Which of the following represents an ecological need for afforestation in regions with extensive barren lands?
(A) Preventing desertification and reducing wind and water erosion of soil
(B) Increasing the immediate availability of synthetic chemical fertilizers
(C) Maximizing the land available for intensive mechanized agriculture
(D) Eradicating all native insect species from the local terrestrial ecosystem

14. What is a primary economic need for large-scale afforestation in developing rural areas?
(A) To entirely replace traditional crop agriculture as the primary source of rural food production
(B) To artificially inflate the market cost of timber to benefit large multinational commercial corporations
(C) To generate local employment via nursery management, tree planting, and harvesting
(D) To systematically reduce the availability of natural fodder, forcing reliance on commercial dairy feeds

15. Match the forestry concept in List I with its primary objective in List II.
List I: (Forestry Concept)
P. Afforestation
Q. Restoration
R. Industrial Forestry
S. Urban Forestry
List II: (Primary Objective)
1. Improving air quality and aesthetics in cities
2. Producing raw material for paper and pulp industries
3. Establishing tree cover on long-standing barren lands
4. Returning a degraded ecosystem to its original natural state
(A) P-3, Q-4, R-2, S-1
(B) P-4, Q-3, R-1, S-2
(C) P-3, Q-2, R-4, S-1
(D) P-2, Q-4, R-3, S-1

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66. When selecting tree species for an afforestation project in an arid region, which physiological trait is most desirable?
(A) Broad, large leaves to maximize transpiration
(B) Requirement of high atmospheric humidity for seed germination
(C) Shallow, spreading roots with high water demand
(D) A deep taproot system and drought tolerance

67. If an afforestation site is characterized by highly saline and alkaline soil (Usar land), which of the following species would be most appropriate for planting?
(A) Prosopis juliflora and Acacia nilotica
(B) Chir Pine species (Pinus roxburghii)
(C) Commercial Teak timber (Tectona grandis)
(D) Native Sal hardwood (Shorea robusta)

68. Which of the following is an ecological criterion for selecting tree species for afforestation?
(A) The prevailing commercial market price of harvested timber in major international trade markets
(B) The aesthetic visual appeal of seasonal flowers for expanding regional ecotourism opportunities
(C) Compatibility with local soil, climate, and native biodiversity
(D) The widespread availability of heavy industrial machinery required to harvest trees efficiently

69. Why is it generally advised to select a mix of species rather than a single species (monoculture) for ecological afforestation?
(A) Mixed species mimic ecosystems, host wildlife, and offer disease resilience.
(B) Mixed species plantations are uniquely susceptible to catastrophic destruction caused by single pest infestations.
(C) Industrial monocultures consistently exhibit faster growth rates than mixed plantations across all environmental conditions.
(D) A diverse mix of species guarantees that harvested timber cannot be legally or profitably sold on commercial markets.

70. Consider the following criteria for selecting tree species for afforestation in watershed areas:
I. Fast growth with deep root systems to bind the soil.
II. High rate of water consumption to dry out the watershed.
III. Evergreen nature to provide continuous canopy cover against rainfall impact.
Which of the above statement(s) is/are correct?
(A) I and II only
(B) I and III only
(C) II and III only
(D) I, II and III

71. In ecological terms, what defines an exotic tree species?
(A) Any tree species that possesses unusually bright, colorful, or highly fragrant flowers
(B) A species introduced outside its natural distribution range
(C) A native indigenous species that has genetically mutated due to intense industrial pollution
(D) An indigenous tree species that produces exceptionally high-value timber suitable for export

72. Which of the following is a commonly cited ecological risk associated with large-scale planting of exotic tree species like Leucaena leucocephala (Subabul) or certain Eucalyptus species?
(A) They immediately attract large populations of wild herbivores, resulting in severe local overgrazing.
(B) They systematically fail to survive because they lack basic physiological adaptations to new climates.
(C) Invasive potential, outcompeting native flora for water and nutrients.
(D) They rapidly convert arid, dry land ecosystems into permanently inundated and waterlogged swamps.

73. What is the primary reason forest departments sometimes prefer exotic species over native species for certain plantation projects?
(A) Exotic species consistently enhance soil nitrogen and fertility better than indigenous leguminous plants.
(B) Native forest species are legally prohibited from being planted under current provisions of the Indian Forest Act.
(C) Exotic species possess unique metabolic traits that allow them to grow without absorbing sunlight or ground moisture.
(D) Exotic species often offer faster growth and shorter rotation cycles.

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List II: (Purpose)

1. Sorting saplings based on size and health before dispatch
2. Transferring tiny seedlings from germination beds to individual containers
3. Preparing the plant for harsh field conditions
4. Breaking seed dormancy to ensure uniform germination

(A) P-4, Q-2, R-3, S-1
(B) P-3, Q-4, R-1, S-2
(C) P-4, Q-3, R-2, S-1
(D) P-2, Q-1, R-4, S-3

106. The Miyawaki method of afforestation, which has gained popularity in India for urban forestry, was developed by a botanist from which country?
(A) Japan
(B) South Korea
(C) China
(D) Indonesia

107. Which of the following is a core characteristic of a forest created using the Miyawaki method?
(A) Very wide spacing between trees to allow heavy machinery access
(B) Ultra-dense planting of multiple native species mimicking natural forest layers
(C) Exclusive use of a single exotic fast-growing timber species
(D) Reliance on continuous synthetic fertilizer application throughout the forest's life

108. According to the principles of the Miyawaki method, how are the tree species generally layered during planting?
(A) Specialized root crop layer, surface grass layer, and trailing vine layer only
(B) Shrub, sub-tree, tree, and canopy layers
(C) Floating aquatic plant layer and tall emergent wetland layer only
(D) Pure commercial timber layer and secondary fruit crop layer only

109. What is the primary advantage of the Miyawaki method in urban afforestation projects?
(A) It creates rapid-growing, self-sustaining dense forests on small land plots.
(B) It requires absolutely zero initial soil preparation and minimal addition of organic compost.
(C) It represents by far the most economical and cheapest tree planting methodology available today.
(D) It creates expansive open grass lawns ideal for urban public recreation and outdoor sports activities.

110. Consider the following statements regarding the Miyawaki method:
I. Extensive soil preparation with biomass (like rice husk and compost) is required before planting.
II. Saplings are planted very close to each other, typically 3 to 5 saplings per square meter.
III. The forest becomes virtually maintenance-free after the first two to three years.
IV. It only utilizes species that take over 100 years to reach a height of 5 meters.
Which of the above statement(s) is/are correct?
(A) I, II and IV only
(B) I, III and IV only
(C) I, II and III only
(D) II, III and IV only

111. Which of the following represents a long-term ecological benefit derived from successful afforestation of a degraded watershed?
(A) Severe increase in downstream flash flooding events during monsoon storms
(B) Complete drying up of deep local aquifers caused by excessive tree transpiration
(C) Systematic regional elimination of all native herbivore and wildlife species
(D) Restoration of stream flows and enhanced groundwater recharge

112. Afforestation plays a vital role in soil conservation. What specific long-term benefit do the root networks of a mature forest provide in hilly terrains?
(A) They deeply fracture stable bedrock layers, directly triggering catastrophic massive landslides.
(B) They chemically break down and convert solid geological rock formations into pure loose sand.
(C) They bind topsoil, reducing landslides and soil erosion.
(D) They form an impermeable subsurface barrier that prevents any rainwater from seeping underground.

113. In terms of long-term economic benefits, how does community afforestation on wastelands support rural livelihoods over decades?
(A) By legally ensuring that the afforested land can eventually be privatized and sold to commercial real estate developers

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81. Afforestation along roadsides (avenue plantation) is primarily intended to achieve which of the following?
(A) To supply high-quality structural timber for heavy commercial building and construction industries
(B) Reducing headlight glare, providing shade, and mitigating noise and air pollution
(C) To create dense, undisturbed wilderness sanctuaries specifically dedicated to large apex carnivores
(D) To physically prevent motor vehicles from legally or safely overtaking one another on public roads

82. Which of the following poses a major challenge to successful roadside afforestation?
(A) Abundant accumulation of rich organic compost naturally derived from roadway dust and debris
(B) Continuous excessive supply of pure, uncontaminated natural rainwater along asphalt road edges
(C) Severe localized deficiency of atmospheric carbon dioxide gas along heavy traffic highway corridors
(D) Unrestricted cattle grazing and damage from passing traffic

83. Urban afforestation is critical for mitigating which specific environmental phenomenon characterized by cities being significantly warmer than surrounding rural areas?
(A) Urban Heat Island (UHI) effect
(B) Greenhouse effect
(C) Ozone depletion
(D) El Niño Southern Oscillation

84. When selecting trees for planting in densely populated urban areas, which characteristic is usually avoided?
(A) High physiological tolerance to elevated ambient air pollution levels
(B) Deeply anchoring taproot systems that prevent structural damage to public pavements
(C) Brittle branches prone to snapping in winds
(D) Expansive, dense leaf canopies capable of offering maximum thermal shade

85. Select the correct sequence of priority steps for establishing urban forestry in a metropolitan city:
(A) Identifying vacant public lands/parks → Selecting pollution-tolerant species → Planting and installing tree guards → Long-term watering and maintenance
(B) Planting and installing tree guards → Identifying vacant public lands/parks → Long-term watering and maintenance → Selecting pollution-tolerant species
(C) Selecting pollution-tolerant species → Long-term watering and maintenance → Identifying vacant public lands/parks → Planting and installing tree guards
(D) Identifying vacant public lands/parks → Long-term watering and maintenance → Planting and installing tree guards → Selecting pollution-tolerant species

86. The success of large-scale afforestation programmes in rural areas heavily relies on local communities. Why is community participation deemed essential?
(A) Because state forest departments completely lack operational staff and technical personnel of their own
(B) Because local rural communities are legally mandated to financially fund all state government forestry projects
(C) Because planted tree saplings will physiologically survive only if manually watered daily by local village residents
(D) Local ownership ensures protection against grazing, fire, and illegal felling

87. The "Van Panchayat" system, a unique model of community forest management, has been highly successful historically in which of the following regions?
(A) The low-lying coastal alluvial plains of Kerala
(B) The hill regions of Uttarakhand
(C) The arid western desert regions of Rajasthan
(D) The tidal mangrove forest belts of West Bengal

88. How does involving local communities in afforestation planning, rather than just execution, improve project outcomes?
(A) It grants local communities absolute authority to legally bypass all state and national environmental regulations.
(B) It completely removes the requirement for employing scientific silvicultural practices in forest management.
(C) Selecting species meeting local needs (fuel, fodder) ensures sustained community

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interest.
(D) It legally guarantees that zero commercial or domestic timber will ever be extracted from the protected forest land.

89. Which of the following statements identifies a negative consequence of excluding local communities from afforestation programmes?
(A) A rapid and sustained increase in the overall long-term survival rate of newly planted saplings
(B) Automatic, self-sustaining biological prevention of wild forest fires throughout dry summer seasons
(C) Significantly enhanced natural regeneration of rare native medicinal herbs and understory plants
(D) Local alienation leading to non-cooperation and potential plantation damage

90. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): Decentralized nursery raising through local women's self-help groups (SHGs) is an effective strategy in afforestation programmes.
Reason (R): It reduces the transportation cost of saplings and simultaneously provides livelihood opportunities to rural women.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

91. India was the first country in the world to adopt a comprehensive National Agroforestry Policy. In which year was this policy introduced?
(A) 1988
(B) 2014
(C) 2002
(D) 2021

92. What is one of the major objectives of the National Agroforestry Policy, 2014?
(A) To strictly ban and criminalize the felling of any tree species located on private agrarian farmlands
(B) Encouraging agroforestry by simplifying tree felling and transit rules
(C) To systematically convert all designated natural reserve forests into commercial agricultural farmlands
(D) To legally mandate that farmers exclusively utilize genetically modified tree species across all regions

93. Under the National Agroforestry Policy, 2014, the establishment of which institutional mechanism was recommended at the national level to coordinate agroforestry initiatives?
(A) Sub-Mission on Agroforestry (SMAF)
(B) The National Green Tribunal of India
(C) The Central Empowered Committee on Forests
(D) The National Biodiversity Authority of India

94. The National Agroforestry Policy, 2014 seeks to address the issue of wood supply in India. Which of the following is a key strategy under the policy regarding this?
(A) Transitioning to importing 100% of all required timber resources exclusively from neighboring countries
(B) Imposing a total, permanent legal ban on all wood-based processing industries operating within the country
(C) Promoting agroforestry for industrial wood supply to relieve pressure on natural forests
(D) Systematically opening and exploiting designated protected forest areas exclusively for commercial timber extraction

95. Identify the incorrect statement regarding the provisions of the National Agroforestry Policy, 2014.
(A) It emphasizes providing institutional credit and insurance cover for agroforestry.
(B) It promotes research and capacity building in the field of agroforestry.
(C) It aims to improve the market access for agroforestry products.
(D) It restricts farmers from integrating livestock into agroforestry systems.

96. Which modern technology is increasingly being used by Forest Departments for monitoring the exact location and survival status of newly planted saplings?
(A) High-precision digital seismographs
(B) Advanced Ground Penetrating Radar systems
(C) GPS geotagging and mobile apps
(D) Deep-water sonar imaging equipment

97. In outcome evaluation of an afforestation project, what does the term 'survival rate' indicate?

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(A) The total census number of native wild animal species that successfully survived winter in the planted forest
(B) Percentage of planted saplings remaining alive after a given period
(C) The maximum growth speed at which an individual tree sapling reaches its full vertical canopy height
(D) The statistical ratio of collected seeds that successfully undergo germination inside a controlled nursery

98. Which of the following parameters is least relevant when evaluating the ecological outcome of an afforestation project?
(A) Long-term increase in overall soil moisture retention capacity
(B) Measurable improvement in local biodiversity including birds, insects, and undergrowth
(C) Quantifiable increase in total soil organic carbon concentration levels
(D) Daily stock market fluctuations of timber companies

99. The Forest Survey of India (FSI) periodically assesses the forest and tree cover of the country. What primary remote sensing technology does FSI use to monitor large-scale afforestation outcomes?
(A) Satellite imagery
(B) Acoustic ground sensors
(C) Visual hot air balloon surveys
(D) Underground seismic mapping networks

100. Consider the following statements regarding monitoring of afforestation projects:
I. Third-party audits are often conducted to ensure transparency in survival rate reporting.
II. Drone technology is now being utilized for aerial monitoring of large and inaccessible plantations.
III. Monitoring ceases completely three months after the initial planting is done.
Which of the above statement(s) is/are correct?
(A) I and II only
(B) I and III only
(C) II and III only
(D) I, II and III

101. Which of the following is a critical activity in nursery management to ensure the production of strong and resilient saplings before they are transplanted to the field?
(A) 'Hardening off' via gradual exposure to sunlight and reduced watering
(B) Keeping tender saplings in complete darkness for weeks to stimulate deep searching root systems
(C) Systematically applying potent chemical weedicides directly onto the leaves on a daily basis
(D) Trimming the central taproot completely to force immediate shallow lateral root development

102. In modern forest nurseries, root trainers are widely used instead of traditional polythene bags. What is the primary advantage of using root trainers?
(A) They represent a much cheaper alternative that completely decomposes in soil instantly upon planting.
(B) They completely eliminate the continuous operational need for watering saplings during nursery growth.
(C) They uniquely enable multiple contrasting plant species to be cultivated within a single container unit.
(D) They prevent root coiling and foster straight downward roots.

103. Which growing medium is commonly preferred in modern root trainer nurseries due to its excellent moisture retention and aeration properties?
(A) Heavy untreated pure clay soil
(B) Cocopeat and vermicompost
(C) Untreated coarse coastal beach sand
(D) Dense unwashed construction gravel

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104. Identify the incorrect practice in quality sapling production.
(A) Sourcing seeds from designated high-quality 'seed stands' or 'plus trees'.
(B) Culling and discarding stunted or diseased seedlings early in the nursery stage.
(C) Overcrowding seedlings in seedbeds to maximize quantity over quality.
(D) Regular grading of seedlings by height and vigor.

105. Match the nursery management practice in List I with its purpose in List II.
List I: (Nursery Management Practice)
P. Seed treatment (e.g., scarification)
Q. Pricking out
R. Hardening off
S. Grading

cover of India as a percentage of its geographical area?
(A) 21.71%
(B) 33.00%
(C) 19.50%
(D) 24.62%

122. Based on national-level data from the India State of Forest Report (ISFR) 2021, which state in India has the largest area under forest cover?
(A) Madhya Pradesh
(B) Arunachal Pradesh
(C) Chhattisgarh
(D) Maharashtra

123. The National Forest Policy of India (1988) set a target for the optimal percentage of geographical area that should be under forest and tree cover to maintain ecological balance. What is this target?
(A) 20%
(B) 33%
(C) 25%
(D) 40%

124. According to the India State of Forest Report (ISFR) 2021, what is the approximate forest cover of Uttar Pradesh as a percentage of its total geographical area?
(A) 9.23%
(B) 6.15%
(C) 12.50%
(D) 15.00%

125. In the context of assessing afforestation success, the India State of Forest Report (ISFR) categorizes forests into VDF, MDF, and OF. What does OF stand for?
(A) Open Forest
(B) Old Forest
(C) Optimal Forest
(D) Outside Forest

126. How do afforestation activities primarily contribute to groundwater recharge?
(A) Tree canopies physically condense atmospheric water vapor directly into deep underground aquifers
(B) Dense tree foliage completely halts groundwater evaporation by absorbing all soil moisture into trunks
(C) Roots create soil channels and humus reduces runoff, enhancing rainwater percolation
(D) Heavy planted forests physically compress topsoil layers, forcefully squeezing groundwater upward to streams

127. Which soil phenomenon, crucial for water conservation, is greatly enhanced by the leaf litter provided by a newly afforested area?
(A) Artificial structural soil compaction and heavy surface hardening
(B) Progressive high-concentration salt accumulation causing topsoil salinization
(C) Deep geological laterization and nutrient leaching of surface topsoil
(D) Humus formation enhancing soil porosity and water retention

128. In watershed management, afforestation is used to reduce "peak flow" during heavy rains. What does this mean?
(A) Artificially maximizing the velocity at which surface rainwater flows directly into local rivers
(B) Ensuring that all rainwater rapidly flows over topsoil surfaces without infiltrating into the ground
(C) Delaying and lowering peak river flow volumes to reduce flood risks
(D) Significantly elevating the maximum ambient thermal temperature across the entire watershed area

129. Identify the incorrect statement regarding the relationship between trees and water conservation.
(A) Forests help in maintaining the base flow of streams during dry seasons.
(B) All tree plantations inherently increase surface runoff compared to barren concrete land.
(C) Extensive planting of highly water-demanding exotic species in arid regions can sometimes deplete local groundwater.
(D) Afforestation prevents the siltation of reservoirs by reducing soil erosion.

130. Consider the following statements regarding the role of afforestation in water conservation:
I. The canopy intercepts rainfall, reducing the kinetic energy of raindrops striking the soil.
II. Leaf litter acts as a sponge, absorbing water and releasing it slowly.
III. Deep-rooted native trees act as 'water pumps', completely drying out deep aquifers in all climates.
Which of the above statement(s) is/are correct?
(A) I and II only

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(B) Providing sustainable non-timber forest products like resins, honey, and medicinal plants
(C) By completely replacing all existing traditional agricultural farming practices with primitive wildlife hunting
(D) By requiring uninterrupted and massive state government financial subsidies to remain economically viable

114. Which of the following is a long-term intangible economic benefit of afforestation?
(A) Immediate direct cash revenues obtained from selling the initial year's pruned tree branches as firewood
(B) Direct cash grants awarded by government agencies for purchasing heavy agricultural tractors
(C) The commercial buyback resale value of plastic root trainer pots returned to government nurseries
(D) Enhanced ecosystem services like pollination and natural pest control for nearby farmlands

115. Consider the following outcomes of a successful afforestation project:
I. Creation of a self-sustaining climax forest ecosystem
II. Stabilization of topsoil and reduction of surface runoff
III. Increase in soil organic matter through leaf litter decomposition
IV. Initial survival and establishment of saplings
Which of the following represents the correct chronological order from short-term to long-term?
(A) IV, II, III, I
(B) IV, III, II, I
(C) II, IV, III, I
(D) IV, II, I, III

116. Bamboo is highly promoted in agroforestry systems in India. Which of the following best describes the botanical classification of bamboo?
(A) A slow-growing softwood tree
(B) A parasitic vine
(C) A type of giant grass
(D) A broadleaved hardwood tree

117. Why was bamboo specifically removed from the definition of a 'tree' under the Indian Forest Act, 1927, through a 2017 amendment?
(A) Exempting non-forest bamboo from felling and transit permits to encourage cultivation
(B) To legally ban and penalize the private cultivation of bamboo species across all private farmlands
(C) To reclassify bamboo strictly as an endangered agricultural crop subject to protection laws
(D) To legally ensure that only the state Forest Department possessed authority to harvest bamboo

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118. What makes bamboo an excellent component for agro-forestry from an economic and ecological perspective?
(A) It requires over 50 years to reach harvest maturity, ensuring stable, long-term rural land lock-in for generations
(B) Its root system secretes biological toxins that permanently prevent all insect pests from entering farmlands
(C) It thrives exclusively on highly saline ocean water, making it suitable for draining marine coastal inlets
(D) Fast growth, continuous harvesting without replanting, and effective soil erosion control

119. Including fruit-bearing trees (Horticulture) in an agro-forestry system is commonly referred to by which specific term?
(A) Intensive silvopasture system
(B) Hortisilviculture
(C) Integrated aquaforestry
(D) Traditional Taungya practice

120. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): The integration of fruit-bearing trees like Mango, Guava, or Amla in agro-forestry provides early and regular income to farmers compared to timber species.
Reason (R): Fruit trees generally have a shorter gestation period before yielding marketable produce compared to the rotation age of timber trees.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

121. According to the India State of Forest Report (ISFR) 2021, what is the total forest and tree

74. Which of the following correctly describes a scenario where native species have a distinct advantage over exotic species in afforestation?
(A) Restoring long-term ecological balance and local food webs
(B) Maximizing rapid, short-term commercial biomass production intended for industrial boiler fuel
(C) Planting trees inside highly controlled, sterile, and completely artificial greenhouse growth facilities
(D) Deliberately introducing novel, non-native pest organisms to alter local agricultural ecosystems

75. Match the tree species in List I with its typical characteristic or origin in List II.
List I: (Tree Species)
P. Eucalyptus
Q. Neem (Azadirachta indica)
R. Lantana camara
S. Sal (Shorea robusta)
List II: (Characteristic/Origin)
1. Native broadleaved climax forest species of North and Central India
2. Highly valued native species known for medicinal and pest-repellent properties
3. Fast-growing exotic tree widely planted for industrial pulp
4. Exotic invasive shrub that degrades forest understories
(A) P-3, Q-2, R-4, S-1
(B) P-3, Q-1, R-4, S-2
(C) P-4, Q-2, R-3, S-1
(D) P-2, Q-3, R-1, S-4

76. How does tree plantation directly contribute to climate change mitigation?
(A) By reflecting solar radiation back into space through their green leaves (albedo effect)
(B) By sequestering atmospheric carbon dioxide into biomass and soil during photosynthesis
(C) By releasing industrial-type chlorofluorocarbons (CFCs) that artificially cool the troposphere
(D) By systematically consuming atmospheric oxygen to reduce overall oxidative planetary stress

77. Which of the following is an adaptation benefit provided by afforestation in the face of climate change?
(A) Shading land, lowering surface temperatures, and buffering extreme weather
(B) Systematically decreasing the overall annual precipitation and cloud cover across the target region
(C) Accelerating global warming by increasing the overall atmospheric concentration of heat-trapping greenhouse gases
(D) Rapidly accelerating the thermal melting of regional mountain glaciers through heat absorption

78. Identify the term used to describe the process where forests absorb and store carbon over long periods, acting as a crucial component in mitigating global warming.
(A) Carbon footprint calculation
(B) Environmental carbon offsetting
(C) Carbon sequestration
(D) International carbon credit trading

79. Older, mature forests eventually reach a state where the carbon they absorb roughly equals the carbon they release through respiration and decay. In contrast, young, actively growing afforestation projects are highly effective at what?
(A) Continuously emitting net positive carbon dioxide directly into the surrounding atmosphere
(B) Completely and permanently halting all ongoing biological components of the natural carbon cycle
(C) Artificially synthesizing and emitting high volumes of potent industrial greenhouse gases
(D) Serving as active carbon sinks to absorb atmospheric CO_2

80. Consider the following statements regarding afforestation and climate change:
I. Afforestation on degraded soils helps restore soil organic carbon.
II. Trees mitigate urban heat island effects in cities.
III. All tree species sequester carbon at the exact same rate regardless of climate.
IV. Forests alter local microclimates by increasing evapotranspiration.
Which of the above statement(s) is/are correct?
(A) I, II and III only
(B) I, II and IV only
(C) II, III and IV only
(D) I, III and IV only

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(B) II and III only
(C) I and III only
(D) I, II and III

131. In the context of the National Afforestation Programme (NAP), what is the primary implementation agency at the village level?
(A) Joint Forest Management Committee (JFMC)
(B) State-level Forest Development Corporation
(C) Registered Non-Governmental Organizations only
(D) Commercial private agricultural corporations

132. What does 'silviculture' precisely deal with in the domain of forestry?
(A) The systematic biological study of wild animal species behavior within dense forest habitats
(B) The remote sensing mapping of regional forest boundaries utilizing modern satellite technology
(C) The science of controlling forest establishment, growth, composition, and health
(D) The commercial distribution and trade marketing of non-timber minor forest produce items

133. A farmer plants rows of trees aligned against the prevailing wind direction to protect his crops from wind damage and reduce soil moisture loss. What is this agro-forestry practice called?
(A) Windbreaks or shelterbelts
(B) Traditional Taungya agroforestry system
(C) Nomadic shifting cultivation practice
(D) Riparian buffer strip management

134. Which of the following agroforestry systems involves cultivating crops in the wide alleys between rows of planted trees or woody shrubs?
(A) Silvopasture
(B) Home gardens
(C) Boundary plantation
(D) Alley cropping

135. Match the tree species in List I with its primary local use or significance in List II.
List I: (Tree Species)
P. Khair (Senegalia catechu)
Q. Shisham (Dalbergia sissoo)
R. Mahua (Madhuca longifolia)
S. Palash (Butea monosperma)
List II: (Primary Local Use/Significance)
1. High-quality timber for furniture
2. Extraction of Katha and medicinal use
3. Flowers used for food, local liquor, and seeds for oil
4. Known as 'Flame of the Forest', used for rearing lac insects
(A) P-2, Q-1, R-3, S-4
(B) P-1, Q-2, R-4, S-3
(C) P-3, Q-4, R-1, S-2
(D) P-2, Q-3, R-1, S-4

136. The 'Taungya' system, introduced in India during the British era, is a classic example of agroforestry. What does it fundamentally involve?
(A) Exclusively cultivating tea and coffee cash crops under the dense canopy shade of natural forest trees
(B) Utilizing specialized heavy industrial machinery to clear-cut mature timber from steep mountain slopes
(C) Permitting farmers to grow crops alongside young tree saplings during early plantation years
(D) Raising livestock animals exclusively on harvested wild forest fodder without felling any standing trees

137. Which state in India is credited with initiating the concept of "Social Forestry" successfully in the 1970s and 80s, serving as a model for others?
(A) Sikkim
(B) Kerala
(C) Punjab
(D) Gujarat

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138. Identify the correct pair representing an afforestation objective and the most suitable tree species for it in North India.
(A) Reclaiming saline/alkaline soils - Prosopis juliflora
(B) Production of high-value fragrant heartwood timber - Populus deltoides
(C) Industrial paper pulp raw material supply - Tectona grandis (Teak)
(D) Commercial silkworm rearing in sericulture - Pinus roxburghii

139. Which of the following is a negative consequence of poorly planned afforestation that ignores local ecology?
(A) Significant, sustained enhancement of regional and local native biodiversity
(B) Converting natural grasslands into unnatural

timber monocultures
(C) Marked increase in the availability of non-timber minor forest produce for local tribal groups
(D) Measurable long-term reduction in regional atmospheric carbon dioxide pollution levels

140. Consider the following statements regarding the challenges of urban afforestation:
I. Lack of adequate space due to dense infrastructure.
II. High pollution levels affecting the survival of sensitive saplings.
III. Vandalism and damage by stray animals.
IV. Excessive availability of natural topsoil rich in organic matter.
Which of the above statement(s) correctly identify the actual challenges?
(A) I, II and IV only
(B) II, III and IV only
(C) I, II and III only
(D) I, III and IV only

141. The concept of "Compensatory Afforestation" implies that trees must be planted over an equivalent area of non-forest land. If non-forest land is not available, compensatory afforestation is typically mandated over what area of degraded forest land?
(A) Double the extent of diverted forest land
(B) Half the exact extent of diverted forest land
(C) Equal to the full extent of diverted forest land
(D) Ten times the total extent of diverted forest land

142. What is meant by "Net Present Value" (NPV) in the context of the diversion of forest land and compensatory afforestation?
(A) The precise direct financial cost of raising and maintaining new tree saplings inside a nursery
(B) The gross commercial market valuation of all timber extracted from the diverted forest land
(C) The quantified value of ecosystem services lost due to forest diversion
(D) The projected future economic valuation of the infrastructure facilities constructed on the land

143. Which technique is most effective for ensuring the survival of saplings in deeply degraded, moisture-deficient lands during afforestation?
(A) Broadening seed distribution by broadcasting seeds loosely over untreated soil surfaces
(B) Systematically applying toxic chemical weedicides across the entire target land area
(C) Severe pruning of young tree saplings down to ground level immediately following planting
(D) Digging deep trenches or contour bunds to retain rainwater

144. Which of the following non-timber forest products (NTFP) is derived from the resin of the Pine (Chir) tree, often integrated into specific afforestation models in the Himalayan foothills?
(A) Natural Katha extract
(B) Refined Sal seed oil
(C) Rosin and Turpentine
(D) Commercial Tendu leaves

145. Under agro-forestry, the practice of growing pasture grasses or legumes beneath trees for animal grazing is specifically referred to as:
(A) Apiculture
(B) Silvopasture
(C) Pisciculture
(D) Sericulture

146. Why is Poplar (Populus deltoides) highly favored by farmers for agroforestry in Western Uttar Pradesh and Punjab?
(A) It grows extremely slowly, providing stable crop security and shade control over a 50-year period
(B) Its commercial timber is 100% immune to all known insect pests and never requires chemical treatment
(C) It produces the single most expensive heartwood on global markets, far surpassing Sandalwood value
(D) It sheds leaves in winter, letting sunlight reach winter crops underneath

147. What is "pollarding" in the context of tree management in agroforestry systems?
(A) Pruning tree tops and upper branches above the reach of grazing animals
(B) Completely uprooting the standing tree to prepare land for planting an entirely different crop
(C) Systematically injecting concentrated chemical liquid fertilizers directly into the main tree trunk
(D) Selectively harvesting mature fruits while keeping all primary structural branches

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completely intact

148. Which tree, often found in arid and semi-arid agroforestry landscapes of India, is revered as a 'Kalpavriksha' because its leaves provide fodder, wood provides fuel, and pods are eaten as food?
(A) Commercial Para Rubber tree (Hevea brasiliensis)
(B) Premium Teak wood (Tectona grandis)
(C) Khejri (Prosopis cineraria)
(D) Broadleaved Sal tree (Shorea robusta)

149. Identify the odd one out among the following trees in terms of their primary utility in industrial forestry.
(A) Sandalwood (Santalum album)
(B) Eucalyptus
(C) Bamboo
(D) Subabul (Leucaena leucocephala)

150. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): The cultivation of Bamboo is highly recommended in degraded ravine lands.
Reason (R): Bamboo has a dense, fibrous root system that effectively binds the soil and quickly arrests gully erosion.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

151. Which of the following is considered the most critical factor for the low survival rate of planted saplings in government afforestation drives in India?
(A) Exclusively utilizing mature, excessively large tree saplings during transplanting
(B) Lack of post-planting care, watering, and protection from animals
(C) Planting young saplings precisely at the very onset of the annual monsoon season
(D) Excessive chemical over-fertilization of topsoil prior to initiating planting drives

152. Under the Uttar Pradesh Afforestation Policy, what is the significance of setting up a "Smriti Vatika"?
(A) It represents a commercial timber production estate managed strictly for economic profit generation
(B) It is a specialized botanical garden dedicated exclusively to cultivating rare exotic floral species
(C) A model where citizens plant trees in memory of loved ones, encouraging personal care
(D) It serves as an industrial outdoor testing facility for experimenting with genetically modified trees

153. A scheme called "Panchavati" plantation involves planting five specific sacred trees. Which of the following is NOT typically one of the traditional Panchavati trees?
(A) Peepal (Ficus religiosa)
(B) Banyan (Ficus benghalensis)
(C) Bael (Aegle marmelos)
(D) Eucalyptus

154. What is the role of a "Pioneer species" in ecological afforestation and restoration?
(A) A hardy species colonizing degraded land to improve soil for later species
(B) It represents the final ecological species to establish itself within a mature climax forest system
(C) It is an invasive parasitic plant species that systematically destroys all surrounding vegetation
(D) It is a highly endangered floral species requiring pristine, completely undisturbed natural habitats

155. Which of the following statements best describes "Carbon Sink" in the context of afforestation?
(A) A specific geographical area or industrial region that emits significantly more carbon dioxide than it absorbs
(B) A reservoir absorbing and storing atmospheric carbon via biological mechanisms
(C) The industrial or natural combustion process of burning fossil fuel reserves within dense forest boundaries
(D) A specialized mechanical filtration device installed on factory smokestacks to scrub carbon emissions

156. In agroforestry, what is the primary benefit of practicing "Alley Cropping" with leguminous shrubs?
(A) Achieving complete, permanent prevention of any direct sunlight reaching the agricultural soil surface
(B) Addition of nitrogen-rich organic mulch to

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or Gram Panchayat. The direct benefits, including fuelwood, fodder, minor forest produce, and shared revenue from sustainable harvests, belong to the village community, ensuring local ownership, equitable resource distribution, and long-term protection of planted vegetation.

19. (A) Planting trees on the sides of roads, canals, and railways, and on wastelands
Extension forestry within the social forestry framework refers specifically to raising tree plantations on public non-forest lands outside traditional forests. This includes planting along roadsides, canal banks, railway lines, and degraded public wastelands. It expands regional green cover, mitigates environmental pollution, and provides local rural communities with non-timber forest produce.

20. (B) I, II and IV only
Social forestry seeks to fulfill local requirements for fuelwood, fodder, and small timber while utilizing idle or fallow lands to expand overall tree cover. By providing these essential resources locally, it alleviates exploitation pressure on natural reserves. Active involvement of local farmers and communities, rather than exclusion, remains central to its operational success.

21. (A) Integrating trees with crops or livestock on the same land unit
Agro-forestry is a dynamic, ecologically based land management system that deliberately integrates woody perennials like trees or shrubs with agricultural crops, livestock, or both on the same land unit. This spatial or temporal arrangement enhances land productivity, diversifies farm income, improves soil fertility, and optimizes natural resource utilization across farming landscapes.

22. (D) Agrisilvicultural system
In agro-forestry classification, a management system where trees or woody perennials are intentionally cultivated in combination with annual or perennial agricultural crops on the same land unit is termed an agrisilvicultural system. This integrated land-use system maximizes solar radiation, optimizes nutrient recycling, and yields both food crops and timber or fuelwood products.

23. (B) Agrosilvopastoral system
An agro-forestry land-use system that concurrently integrates woody perennial trees, agricultural food crops, and pasture with livestock grazing on a single management unit is designated as an agrosilvopastoral system. This integrated approach optimizes multi-layered canopy utilization, enhances nutrient cycling between livestock and vegetation, and diversifies farm outputs across multiple production streams.

24. (C) Boundary plantation
Planting Poplar trees along the outer edges or bunds of an active wheat field is classified as a boundary plantation. This agro-forestry practice enables farmers to generate commercial timber income without displacing primary agricultural crops, while simultaneously serving as a windbreak, stabilizing field borders, and optimizing land-use efficiency along field perimeters.

25. (A) Selection of tree/crop combinations → Land preparation → Planting and sowing → Maintenance and pruning
Establishing an agro-forestry model on degraded land follows a structured sequence. First, compatible tree and crop combinations are chosen based on soil and climatic conditions. Next, site land preparation is carried out. Planting and sowing of trees and crops then follow, concluded by ongoing management, maintenance, and periodic pruning to prevent shading.

26. (A) Diversification of income sources and reduced risk of total crop failure
Adopting agro-forestry provides farmers with crucial economic stability by diversifying production streams across crops, fruits, fodder, and timber. If annual agricultural crops suffer from drought, disease, or market fluctuations, perennial tree products offer secondary income sources. This multi-crop approach lowers overall financial vulnerability and safeguards long-term rural household livelihoods.

27. (B) Canopy breaks rainfall impact while roots bind soil against erosion.
Agro-forestry enhances soil conservation through dual physical mechanisms. The upper tree canopy reduces the kinetic energy of falling raindrops, protecting the soil surface from splash erosion. Concurrently, the extensive subterranean root networks of trees bind loose soil particles

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beauty and recreation for urban populations
(D) To legally and physically prohibit all forms of human entry into protected forest zones

165. Which of the following terms describes the cultivation of trees and agricultural crops in a systematic manner that specifically mimics the structure of a natural forest?
(A) Food forest / multi-strata system
(B) Industrial monoculture crop farming
(C) Slash and burn shifting cultivation
(D) Controlled hydroponic crop production

166. A critical step in ensuring the success of a newly afforested area is "weeding". Why is weeding essential in the first two years of a plantation?
(A) Invasive weeds dynamically divert atmospheric rain-bearing clouds away from newly planted tree areas
(B) Weeds naturally synthesize and secrete strong organic acids that physically scorch young tree trunks
(C) Dense weed growth mechanically obstructs and prevents the natural physiological shedding of tree bark
(D) Weeds compete with saplings for moisture, nutrients, and light.

167. Which of the following defines the term "Rotation Period" in industrial forestry?
(A) The total time required for a collected seed to successfully complete germination inside a nursery
(B) The duration between planting and final harvest for optimal economic return
(C) The natural seasonal cycle of foliage shedding and subsequent regrowth across autumn and spring
(D) The average number of daily hours an individual tree receives direct unshaded sunlight exposure

168. Planting trees in the "Terai" region requires species that can tolerate which specific environmental condition?
(A) Extreme frost and snowfall
(B) Extremely arid and desert-like shifting sand dunes
(C) High water table and occasional waterlogging
(D) High salinity from coastal sea breezes

169. What is the fundamental difference between 'Farm Forestry' and 'Extension Forestry' within the Social Forestry program?
(A) Farm forestry is conducted exclusively on public state lands, whereas extension forestry is conducted on private holdings.
(B) Farm forestry relies solely on introduced exotic species, whereas extension forestry utilizes native indigenous species only.
(C) Farm forestry generates zero economic return for growers, whereas extension forestry operates as a commercial venture.
(D) Farm forestry is on private farm lands; extension forestry is on public/community lands.

170. Which of the following statements best summarizes the holistic goal of the Green India Mission (GIM)?
(A) Increasing forest cover, improving ecosystem services, and boosting livelihoods while curbing climate change
(B) To aggressively maximize commercial timber export revenues exclusively for the central government treasury
(C) To completely eliminate and eradicate all traditional human presence from protected forested zones across India
(D) To research and mass-produce genetically engineered tree species that require virtually no water or nutrients

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promote agro-forestry among local farmers, and execute habitat restoration across degraded lands.

37. (A) A mass movement engaging citizens, farmers, local bodies, and government departments
The "Vriksharopan Jan Andolan" in Uttar Pradesh is a broad-based mass public movement that actively engages citizens, farmers, local self-government bodies, non-governmental organizations, and multiple state departments. This participatory campaign mobilizes community action to achieve ambitious annual tree planting targets, expand regional green cover, and protect newly planted saplings.

38. (D) They hold cultural and medicinal value while purifying air.
Uttar Pradesh's afforestation policy specifically prioritizes planting Peepal, Banyan, and Neem trees due to their immense ecological, medicinal, and socio-cultural importance. These indigenous long-lived species possess expansive canopies that produce significant oxygen, absorb atmospheric pollutants, offer high shade capacity, support local bird populations, and hold deep reverence in traditional cultural practices.

39. (B) Geotagging saplings and monitoring via mobile applications
To guarantee long-term survival of saplings planted during massive drives, forest authorities employ modern digital tracking tools like geotagging and dedicated mobile applications. Assigning geographic coordinates and uploading periodic physical updates enables continuous monitoring of growth, survival rates, and maintenance needs, ensuring transparency and accountability across plantation sites.

40. (B) I and III only
Uttar Pradesh's afforestation strategy distributes subsidized or free saplings through government nurseries to encourage public participation and establishes cultural plantations like Smriti Vatikas and Navagraha Vatikas. Fruit-bearing trees are actively promoted rather than avoided, as they enhance rural household nutrition, generate supplemental income, and support local wildlife biodiversity across rural districts.

41. (D) Compensatory Afforestation Fund Management and Planning Authority
CAMPA stands for the Compensatory Afforestation Fund Management and Planning Authority. Formed to oversee funds collected from user agencies diverting forest land for non-forest development, CAMPA ensures that these monetary funds are systematically utilized for compensatory afforestation, ecological restoration, wildlife conservation, and modernizing forest management infrastructure nationwide.

42. (A) Levies on user agencies for diverting forest land to non-forest uses
CAMPA funds are collected from industrial and infrastructure user agencies that divert government forest land for non-forest purposes. These mandatory payments include the net present value of diverted forests, costs of equivalent non-forest compensatory land, and species protection expenses, ensuring financial resources are available for establishing replacement tree cover elsewhere.

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43. (B) 90% to State, 10% to National
Under the provisions of the Compensatory Afforestation Fund Act, 2016, 90 percent of the collected funds are allocated directly to State CAMPA authorities to execute ground-level afforestation and ecosystem restoration. The remaining 10 percent is retained by National CAMPA for national policy formulation, oversight, technical research, and monitoring.

44. (B) Salaries, allowances, and travel expenses of regular forest staff
According to the Compensatory Afforestation Fund rules, CAMPA funds are strictly designated for ecological enhancement, artificial regeneration, soil conservation, and forest protection infrastructure. Using these funds to pay regular administrative salaries, allowances, or routine travel expenses of permanent forest staff is explicitly prohibited to prevent diversion into recurring operational expenses.

45. (A) P-4, Q-3, R-1, S-2
CAMPA compensates for forest land diversion through mandatory planting funds. The Green India Mission focuses on climate adaptation and carbon sink expansion. The Nagar Van scheme enhances urban municipal tree cover. MGNREGA provides rural wage employment by funding

9. (D) Restoration requires exotic timber species to completely replace native flora.
Ecological restoration focuses on returning degraded forest ecosystems to their natural native state, making the complete replacement of native flora with exotic timber species an incorrect practice. True restoration emphasizes conserving local biodiversity, utilizing indigenous plants, and fostering natural ecological succession rather than establishing artificial monocultures of non-native commercial timber trees.

10. (A) I and II only
Afforestation takes place on land historically lacking forest cover, while reforestation occurs on recently deforested or degraded forest land. Both practices sequester atmospheric carbon, mitigating climate change. However, reforestation does not mandate exotic species; utilizing native vegetation is generally preferred to maintain ecological balance and restore original biodiversity structures.

11. (B) Afforestation applies to land un-forested for 50+ years; reforestation applies to land deforested since 1990.
Under the Kyoto Protocol legal framework, afforestation is explicitly defined as creating forest cover on land that has been without forest for at least fifty years. In contrast, reforestation applies to establishing forest cover on land that was forested previously but was deforested prior to the benchmark year of 1990.

12. (B) Afforestation
Planting trees on the barren ravines of the Chambal region where no forest has existed in recorded history is classified as afforestation. Establishing tree cover on historically non-forested or long-standing barren landscapes transforms degraded non-forest land into productive tree cover, helping to prevent further gully erosion and establish initial biological ecosystems.

13. (A) Preventing desertification and reducing wind and water erosion of soil
Establishing tree cover on extensive barren lands fulfills a vital ecological need by arresting desertification and mitigating soil degradation. Tree roots bind loose soil particles, while tree canopies intercept heavy rainfall and break wind velocity. This structural protection significantly reduces topsoil loss from water runoff and wind erosion in vulnerable environments.

14. (C) To generate local employment via nursery management, tree planting, and harvesting
Large-scale afforestation in developing rural areas provides direct economic benefits by generating employment across multiple operational phases. Local communities gain sustainable wage livelihoods through managing plant nurseries, executing land preparation, planting saplings, and carrying out post-plantation maintenance, thereby fostering rural economic resilience alongside environmental restoration and landscape greening.

15. (A) P-3, Q-4, R-2, S-1
Afforestation establishes tree cover on long-standing barren lands to create new forests. Restoration aims to return degraded ecosystems to their original natural condition. Industrial forestry focuses on producing raw materials for paper, pulp, and timber manufacturing. Urban forestry enhances city environments by improving local air quality, reducing ambient heat, and adding aesthetic value.

16. (C) The National Commission on Agriculture (1976)
The concept of social forestry in India gained formal recognition and promotion through the recommendations of the National Commission on Agriculture in 1976. The commission emphasized raising tree plantations on non-forest lands, community spaces, and farm boundaries to fulfill local rural needs for fuelwood, fodder, and small timber while reducing pressure on natural reserves.

17. (B) Commercial clear-felling forestry
Social forestry primarily encompasses farm forestry, community forestry, and extension forestry aimed at satisfying local community needs and promoting environmental conservation. Commercial clear-felling forestry, which involves large-scale industrial harvesting of natural forests for profit, is fundamentally excluded from social forestry frameworks designed to involve and benefit local populations on non-forest lands.

18. (D) The local community or Gram Panchayat
Under community forestry initiatives, tree plantations established on village common lands are collectively managed by the local community

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ANSWERS

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1. (B) The establishment of a forest or stand of trees in an area where there was no previous tree cover

Afforestation refers to the practice of planting trees and establishing a forest on land that has historically lacked forest cover or remained unforested for an extended period. This process converts non-forested areas into new woodland, helping to restore ecological balance, expand biological carbon sequestration, mitigate soil degradation, and foster resilient local terrestrial ecosystems.

2. (D) Afforestation

Planting trees on land that has not historically contained forests is scientifically defined as afforestation. This targeted intervention aims to convert non-forested regions into thriving vegetative ecosystems, thereby creating active long-term carbon sinks and stabilizing topsoil structure against water and wind erosion while expanding the overall territorial green cover across ecological zones.

3. (A) Conducting a comprehensive soil and climate suitability analysis

Before selecting specific tree species for establishing forests in new areas, conducting a comprehensive soil and climate suitability analysis is essential. Evaluating soil texture, pH levels, moisture retention, nutrient availability, and regional climatic variables ensures that the selected vegetation can adapt effectively, maximize sapling survival rates, and promote long-term ecological sustainability.

4. (C) Prioritizing monoculture plantations of water-intensive exotic species in arid regions

Prioritizing monoculture plantations of water-intensive exotic species in arid regions represents an improper forestry practice. Arid ecosystems suffer from severe water scarcity, and introduced exotic monocultures deplete underground aquifers, disrupt native biodiversity, and degrade local soil health. Sustainable establishment requires diverse, drought-tolerant species suited to regional hydrologic and climatic conditions.

5. (A) Restoring the structure and function of a previously existing forest

Forest restoration focuses specifically on returning a degraded, damaged, or destroyed forest to its original structure, ecological function, and species composition. Unlike afforestation, which introduces tree cover onto historically non-forested land, restoration works within existing or former forest ecosystems to assist natural regeneration processes and recover native biological diversity.

6. (D) The replanting of trees in areas that have been deforested or recently degraded

Reforestation is defined under international environmental frameworks as the re-establishment of forest cover on lands where forests were previously present but subsequently removed or degraded through logging, fires, or deforestation. Replanting these areas aids in re-establishing ecosystem functions, restoring damaged habitats, improving soil stability, and enhancing local biomass carbon storage.

7. (B) Reforestation

Replanting trees on land cleared for agriculture a decade prior constitutes reforestation. Because the site originally possessed forest cover before being cleared for farming, re-establishing tree vegetation on this land restores a previously existing forest ecosystem. This practice aids in restoring soil fertility, expanding regional tree canopy, and re-establishing lost ecological habitats.

8. (C) Planting pioneer grasses and nitrogen-fixing shrubs prior to trees

Restoring degraded forest land that has experienced severe topsoil erosion requires initial planting of pioneer grasses and nitrogen-fixing shrubs. These early-colonizing plants stabilize loose soil, accumulate organic matter, fix atmospheric nitrogen, and improve microclimatic conditions. This prepares the degraded landscape for the eventual successful establishment and growth of secondary climax tree species.

together, improving soil structure, increasing water infiltration, and dramatically reducing surface runoff erosion.

28. (B) They fix atmospheric nitrogen, enhancing soil fertility naturally.
Integrating leguminous trees into agro-forestry systems delivers major ecological benefits because these plants form symbiotic relationships with nitrogen-fixing bacteria in their root nodules. They convert atmospheric nitrogen into bioavailable soil compounds, enriching soil organic matter through leaf litter and reducing the necessity for synthetic chemical fertilizers in agricultural fields.

29. (A) It maximizes monoculture yield by eliminating competition.
Agro-forestry is inherently a multi-species, polyculture system, making the maximization of monoculture yield an incorrect statement. Instead of eliminating biological competition, agro-forestry optimizes resource sharing among diverse species. It creates beneficial microclimates, sequestering carbon, reducing soil erosion, and providing alternative livestock fodder, while maintaining higher overall biomass productivity compared to single-crop systems.

30. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Agro-forestry systems achieve higher total biomass production per unit area than monoculture crop fields. This elevated productivity occurs because multi-layered canopies and varying root depth distribution allow trees and agricultural crops to capture sunlight, soil nutrients, and ground moisture from distinct ecological strata, minimizing direct competition and optimizing resource use efficiency.

31. (D) Van Mahotsav
Van Mahotsav is an annual week-long tree-plantation festival celebrated throughout India during the first week of July. Initiated in 1950, this nationwide campaign encourages citizens, schools, civic organizations, and government agencies to plant native trees, raising environmental consciousness and expanding national forest cover at the onset of the monsoon season.

32. (C) To generate public awareness and rapidly expand state green cover
Mass single-day tree plantation drives organized by state governments aim to mobilize public participation, raise widespread environmental awareness, and rapidly increase overall tree canopy cover. Involving government bodies, educational institutions, non-governmental organizations, and local communities fosters a shared sense of environmental stewardship, accelerating ecological restoration across state landscapes.

33. (B) 200
The 'Nagar Van' (Urban Forest) scheme launched by the Government of India aims to create 200 urban forests across the country in urban local bodies. This initiative focuses on converting vacant urban spaces into rich green patches, enhancing urban biodiversity, mitigating microclimatic heat islands, and providing healthy recreational spaces for city residents.

34. (D) MGNREGA
The Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) integrates rural wage employment with environmental conservation by funding large-scale tree plantations, check dam construction, and land development activities. It provides guaranteed rural wage labor while simultaneously building community forestry assets, improving local water tables, and expanding green cover across rural regions.

35. (A) Namami Gange Afforestation - Planting trees along Ganga banks to curb erosion and pollution
The Namami Gange Afforestation program focuses on raising dense riverine vegetation along the banks of the River Ganga and its tributaries. Planting deep-rooted trees along the river corridors binds bank soil, reduces silt deposition, filters agricultural runoff, enhances water quality, and restores native riparian ecosystems along the river basin.

36. (C) To increase the state's forest and tree cover to 15 percent by the year 2030
A key environmental target of the Uttar Pradesh government is expanding the state's total forest and tree cover to 15 percent by the year 2030. To reach this goal, state environmental authorities execute massive annual plantation campaigns,

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Management Committee. Next, micro-planning takes place to identify degraded patches. Subsequently, a Memorandum of Understanding is signed between the committee and the forest department, leading to execution of planting.

56. (C) Supplying industrial raw materials for paper, pulp, and timber industries
Industrial forestry involves establishing fast-growing tree plantations with the core goal of supplying raw materials to wood-based industries, such as paper, pulp, plywood, furniture, and matchwood production. It focuses on maximizing timber volume yield per hectare through intensive management practices to satisfy commercial industrial demands efficiently.

57. (D) Eucalyptus
Eucalyptus is extensively cultivated in industrial forestry across India to meet the demands of the pulp and paper industry. Its rapid growth rate, straight trunk form, high cellulose content, and adaptability to varied soil conditions make it a highly favored species for high-yield, short-rotation commercial timber production.

58. (A) It focuses on intensive management practices to maximize yield per unit area.
Industrial forestry relies on intensive management practices, including site preparation, quality seedling selection, irrigation, fertilization, and weed control, to maximize timber volume and yield per unit area. It prioritizes high economic efficiency, short rotation cycles, and uniform wood quality to supply wood processing industries consistently.

59. (B) Groundwater depletion and loss of biodiversity from monoculture
A primary criticism of large-scale industrial forestry utilizing fast-growing exotic species like Eucalyptus is its environmental impact. Deep-rooting exotic trees absorb vast quantities of water, depleting localized groundwater tables. Additionally, dense single-species monocultures offer limited habitat diversity, leading to reduced native plant and wildlife species richness.

60. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Industrial tree plantations frequently employ clonal forestry techniques because propagating selected superior parent trees vegetatively yields genetically uniform stock. This genetic consistency ensures uniform growth rates, standardized timber quality, synchronized rotation ages, higher total volume yield, and simplified harvesting processes, optimizing industrial efficiency and financial returns.

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61. (A) Farmers planting on their private lands or farm boundaries
Farm forestry refers to the practice where individual farmers plant and manage trees on their private agricultural land, field bunds, or farm boundaries. Farmers undertake this activity to produce timber, fuelwood, or fodder for personal household use or to sell commercially to local wood processing industries for supplemental income.

62. (C) Growing timber trees on the bunds and boundaries of agricultural fields
A common practice in farm forestry is growing commercial timber or multi-purpose trees along the boundary bunds of agricultural fields. This boundary arrangement allows farmers to cultivate annual food crops uninterrupted while simultaneously raising high-value tree species, maximizing overall land utility without sacrificing primary agricultural crop production.

63. (D) Agroforestry integrates trees with crops/ livestock, while farm forestry can focus solely on commercial trees.
Traditional agro-forestry emphasizes ecological integration and spatial interaction between trees, agricultural crops, and livestock. In contrast, farm forestry specifically refers to farmers growing trees on private farmland, which may involve pure commercial block plantations of single timber species without necessarily intercropping with food crops or integrating animal livestock.

64. (C) Farm forestry
Converting an underperforming patch of private farmland entirely into a Casuarina tree plantation for pole production is a clear example of farm forestry. The farmer utilizes private agricultural land to cultivate a commercial tree crop, optimizing land productivity and generating specialized timber income from otherwise low-yielding agricultural soils.

65. (B) Cumbersome felling and transit permit regulations for private timber
A major historical barrier restricting the widespread expansion of farm forestry in several

public asset creation, including community tree plantations and land conservation projects.

46. (C) National Action Plan on Climate Change (NAPCC)
The Green India Mission (GIM) is one of the eight core national missions instituted under the National Action Plan on Climate Change (NAPCC). It addresses climate change by enhancing ecosystem services, restoring degraded forest lands, expanding biological carbon sinks, and supporting forest-dependent communities through sustainable natural resource management.

47. (D) 5 million hectares
The Green India Mission aims to increase forest and tree cover on 5 million hectares of non-forest or degraded land while simultaneously improving the quality and density of existing canopy cover on another 5 million hectares. This double target seeks to expand national carbon sinks and restore degraded ecosystems.

48. (C) By boosting forest livelihood income for 3 million households
The Green India Mission directly supports local economic development by aiming to enhance forest-based livelihood income for up to 3 million forest-dependent households. It integrates ecosystem restoration with sustainable non-timber forest product collection, small-scale enterprise development, and eco-restoration employment, improving household income while protecting local natural resources.

49. (B) Sequestering 50 to 60 million tonnes of carbon annually
A major ecological objective of the Green India Mission is enhancing biological carbon sinks to sequester 50 to 60 million tonnes of carbon dioxide equivalent annually by 2020 and beyond. This objective contributes directly to India's international climate mitigation commitments under global environmental treaties by absorbing atmospheric greenhouse gases.

50. (B) I, II and IV only
The Green India Mission focuses on improving ecosystem services through a landscape-based approach and actively involves local participatory institutions like Gram Sabhas and Joint Forest Management Committees. Enforcement is not managed by Central Armed Police Forces, as the mission relies on community empowerment and decentralization rather than militarized forest policing.

51. (A) Joint Forest Management Committee (JFMC)
The Joint Forest Management Committee (JFMC) is the institutional body established at the village level to manage and protect forest patches collaboratively with state forest departments. Comprising village community representatives and forest officers, the JFMC executes local protection, prevents illegal felling, and shares ecological and economic benefits from restored forests.

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52. (C) Failure of strict policing alone and the need for local community involvement
Joint Forest Management (JFM) emerged after recognizing that top-down forest policing without local cooperation failed to protect forest resources. Involving surrounding rural communities in decision-making, conservation, and benefit-sharing creates local ownership, effectively mitigating forest degradation, reducing resource conflicts, and ensuring long-term sustainability of forest ecosystems.

53. (A) Members receive non-timber forest produce and a portion of final timber harvest revenue.
In community afforestation models like Joint Forest Management, benefit-sharing mechanisms entitle local committee members to gather non-timber forest products like fuelwood, fodder, seeds, and medicinal herbs. Furthermore, communities receive a specified percentage of the financial revenue generated when timber trees are sustainably harvested at rotation maturity.

54. (D) Gram Sabha
Under the provisions of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, the Gram Sabha is legally empowered to protect, conserve, and manage community forest resources. It grants indigenous communities statutory authority to regulate local natural resources, prevent ecological degradation, and practice sustainable forestry.

55. (C) III, II, I, IV
Setting up a Joint Forest Management project follows a logical operational order. First, the village assembly constitutes the Joint Forest

crops from pruned branches
(C) Achieving total, permanent elimination of the operational need for manual or rainfall water irrigation
(D) Causing a drastic, long-term reduction in overall biological crop biomass produced per hectare of land

157. Which tree is recognized as the State Tree of Uttar Pradesh and is frequently prioritized in cultural and ecological plantation drives within the state?
(A) Ashoka tree (Saraca asoca)
(B) Peepal tree (Ficus religiosa)
(C) Sacred Banyan (Ficus benghalensis)
(D) Native Sal tree (Shorea robusta)

158. Which of the following practices constitutes "Extension Forestry"?
(A) Exclusively planting native tree species inside strictly degraded state forest reserves
(B) Systematically expanding private agricultural crop fields by clearing contiguous natural forest margins
(C) Planting along roads, canal banks, railways, and village common lands
(D) Cultivating purely ornamental flower and shrub species on private urban residential balconies

159. When setting up a forest nursery, why is the site usually chosen near a perennial water source?
(A) To enable easy, low-cost water transport of raised saplings using boats and barges
(B) Because tree seeds will physiologically germinate only when fully submerged underwater
(C) To ensure that nursery soil beds remain permanently waterlogged, saturated, and muddy
(D) Seedlings require regular and assured irrigation for survival

160. What is the primary purpose of constructing a "shade house" or "green net" in a forest nursery?
(A) To completely conceal young growing saplings from local wild herbivores and destructive pests
(B) To trap high concentrations of carbon dioxide and artificially boost photosynthesis rates
(C) Protecting tender saplings from direct sun, heavy rain, and temperature swings
(D) To completely and permanently halt the natural biological process of leaf transpiration

161. A candidate for afforestation in an area affected by severe wind erosion should preferably possess which of the following root characteristics?
(A) Extremely shallow, delicate, and brittle root systems
(B) A deep taproot and extensive lateral roots to anchor soil
(C) An extremely short central taproot entirely lacking lateral root branches
(D) Specialized aerial prop roots hanging downward from main tree branches

162. How does the implementation of the Forest Rights Act (FRA), 2006, positively impact afforestation and forest conservation?
(A) It actively encourages unrestricted large-scale commercial timber logging operations by indigenous tribal communities
(B) It completely dismantles state forest departments, leaving all public forest lands unmanaged and unprotected
(C) It strictly restricts all afforestation activities exclusively to non-forest private agricultural lands
(D) Secure tenure rights incentivize forest communities to protect and regenerate local resources.

163. The concept of "Clonal Forestry", often used in industrial plantations, involves raising trees from which of the following?
(A) Vegetative cuttings of a superior parent tree for identical genetic traits
(B) Wild tree seeds gathered randomly across multiple contrasting geographical forest regions
(C) Artificially modifying plant seed genomes by combining them with animal genetic material
(D) Grafting high-yield fruit-bearing branches directly onto non-fruit-bearing wild timber trees

164. What is the primary objective of "Recreation Forestry" or "Aesthetic Forestry", a sub-branch of social forestry?
(A) To produce maximum volume of commercial timber within the shortest possible timeframe
(B) To capture and systematically train native wild animals for commercial circus performances
(C) Creating green spaces offering aesthetic

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Indian states has been complex regulatory procedures regarding tree felling and wood transit. Restrictive administrative permits required to cut down and transport privately grown trees discourage farmers from adopting commercial tree planting on farmland.

66. (D) A deep taproot system and drought tolerance
Selecting tree species for afforestation in arid regions requires physiological traits like a deep taproot system and high drought tolerance. Deep taproots reach lower subterranean water tables, while drought-tolerant adaptations—such as reduced leaf surface area and thick cuticles—minimize transpiration loss, allowing saplings to survive extreme drought.

67. (A) Prosopis juliflora and Acacia nilotica
Reclaiming highly saline and alkaline soils (Usar lands) requires salt-tolerant, hardy pioneer species like Prosopis juliflora and Acacia nilotica. These species withstand elevated soil pH, high osmotic stress, and sodium toxicity, while their root activity and leaf litter gradually improve soil structure, lower pH, and enhance organic matter.

68. (C) Compatibility with local soil, climate, and native biodiversity
The primary ecological criterion for selecting tree species in afforestation is compatibility with local soil conditions, regional microclimates, and existing native biodiversity. Choosing ecologically suited species ensures high sapling survival rates, prevents introduction of invasive threats, restores natural food webs, and establishes a stable, self-sustaining forest ecosystem.

69. (A) Mixed species mimic ecosystems, host wildlife, and offer disease resilience.
Selecting a diverse mix of native species rather than a single-species monoculture is crucial for ecological afforestation. Mixed species plantations mimic natural forest ecosystems, provide structural habitats for diverse wildlife, improve soil nutrient recycling across soil layers, and offer strong resilience against catastrophic disease outbreaks and pest infestations.

70. (B) I and III only
Selecting tree species for watershed afforestation prioritizes rapid growth with deep root networks to bind surface topsoil and evergreen foliage to maintain year-round canopy protection against heavy rain impact. High water-consuming trees that desiccate watershed aquifers are strictly avoided to ensure sustained baseline streamflows and groundwater levels.

71. (B) A species introduced outside its natural distribution range
In ecological terminology, an exotic tree species is any plant species living outside its natural native distribution range, having been introduced either intentionally or accidentally through human activity. Exotic species may adapt rapidly to new environments, but sometimes pose ecological risks if they become invasive and outcompete indigenous vegetation.

72. (C) Invasive potential, outcompeting native flora for water and nutrients.
Large-scale planting of exotic tree species presents significant ecological risks, including invasive behavior where fast-growing exotics aggressively compete with native flora for ground moisture, sunlight, and soil nutrients. This ecological displacement can degrade natural habitats, alter hydrological regimes, and diminish overall regional plant and animal biodiversity.

73. (D) Exotic species often offer faster growth and shorter rotation cycles.
Forest departments and commercial enterprises sometimes select exotic species over native trees due to their rapid growth rates and shorter rotation cycles. Exotic timber species like Eucalyptus or Poplar reach harvestable maturity much faster than native hardwoods, providing quicker financial returns and rapidly supplying industrial pulp and timber.

74. (A) Restoring long-term ecological balance and local food webs
Native species possess a distinct advantage over exotic species when the primary goal is restoring long-term ecological balance and native biodiversity. Indigenous trees have co-evolved with local soil organisms, insects, birds, and mammals, making them essential for supporting complex local food webs and maintaining resilient natural ecosystems.

75. (A) P-3, Q-2, R-4, S-1
Eucalyptus is a fast-growing exotic tree planted for industrial pulp. Neem is a valuable native tree renowned for medicinal and pest-repellent properties. Lantana camara is an exotic invasive

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shrub that degrades forest understories. Sal is a native broadleaved climax forest tree species characteristic of North and Central India.

76. (B) By sequestering atmospheric carbon dioxide into biomass and soil during photosynthesis
Tree plantations contribute directly to climate change mitigation by capturing atmospheric carbon dioxide through photosynthesis. Trees convert carbon gas into biological organic matter stored in trunks, branches, roots, and surrounding soil. Expanding forest cover creates persistent carbon sinks that decrease the concentration of heat-trapping greenhouse gases in the atmosphere.

77. (A) Shading land, lowering surface temperatures, and buffering extreme weather
Afforestation provides vital climate adaptation benefits by shading land, lowering ambient temperatures via evapotranspiration, and buffering ecosystems against extreme weather events. Forest canopies protect soil surfaces, regulate local water flows, mitigate storm impacts, and create cooler microclimates, helping surrounding human and natural communities adapt to climate change risks.

78. (C) Carbon sequestration
Carbon sequestration describes the process by which trees and living vegetation absorb carbon dioxide from the atmosphere during photosynthesis and store it long-term within plant biomass and forest soils. This biological trapping mechanism plays a fundamental role in lowering net atmospheric carbon levels and curbing global climate warming trends.

79. (D) Serving as active carbon sinks to absorb atmospheric CO_2
Young, rapidly growing afforestation projects serve as highly effective active carbon sinks. Unlike mature climax forests where carbon absorption roughly balances carbon release from decay, young trees exhibit high photosynthetic rates to build new structural wood, absorbing large volumes of atmospheric carbon dioxide to accelerate climate change mitigation.

80. (B) I, II and IV only
Afforestation restores soil organic carbon, moderates urban heat island effects, and alters local microclimates through evapotranspiration. Carbon sequestration rates vary significantly depending on species, growth rate, age, climate, and soil conditions; therefore, statement III is incorrect as different tree species do not sequester carbon at identical rates.

81. (B) Reducing headlight glare, providing shade, and mitigating noise and air pollution
Avenue plantation along roadsides is primarily conducted to enhance environmental quality and road safety. Trees planted along transportation corridors reduce vehicular headlight glare, offer thermal shade to travelers, trap harmful suspended particulate matter, absorb traffic noise, and capture carbon emissions generated by motor vehicles along transit routes.

82. (D) Unrestricted cattle grazing and damage from passing traffic
Roadside afforestation faces major survival challenges from unrestricted cattle grazing, physical breakage by stray animals, and mechanical damage from passing vehicular traffic. Newly planted saplings along highway margins require sturdy protective tree guards, regular watering schedules, and continuous monitoring to survive harsh roadside environments and human disturbance.

83. (A) Urban Heat Island (UHI) effect
Urban afforestation mitigates the Urban Heat Island effect, where urban centers experience significantly higher ambient temperatures than surrounding rural areas due to dense concrete, asphalt surfaces, and human activity. Trees cool cities through solar shading and evapotranspiration, lowering land surface temperatures and improving urban thermal comfort.

84. (C) Brittle branches prone to snapping in winds
When choosing trees for urban environments, species with brittle branches prone to snapping during high winds are explicitly avoided. Falling limbs present severe hazards to pedestrians, vehicles, and power lines. Preference is given to sturdy, wind-resistant species with non-invasive taproots and strong wood structures that withstand urban storms.

85. (A) Identifying vacant public lands/parks → Selecting pollution-tolerant species → Planting

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and installing tree guards → Long-term watering and maintenance
Establishing urban forestry follows a clear chronological process. First, suitable vacant public lands or municipal parks are identified. Next, pollution-tolerant tree species suited to urban conditions are chosen. Then, saplings are planted alongside protective tree guards. Finally, regular long-term watering, weeding, and maintenance are carried out to ensure survival.

86. (D) Local ownership ensures protection against grazing, fire, and illegal felling
Active community participation is crucial for rural afforestation success because local involvement fosters a sense of ownership over planted trees. When villagers participate in planning and management, they actively protect saplings from livestock grazing, forest fires, and illegal felling, ensuring much higher long-term plantation survival rates than unmonitored projects.

87. (B) The hill regions of Uttarakhand
The Van Panchayat system is a historical community-based forest management model operating in the hill regions of Uttarakhand. Formed in the 1930s, Van Panchayats empower village communities to autonomously manage, protect, and utilize local civil forest resources, representing one of India's earliest successful institutional examples of participatory forest management.

88. (C) Selecting species meeting local needs (fuel, fodder) ensures sustained community interest.
Involving local communities in afforestation planning enables the selection of tree species that directly satisfy local economic needs, such as fuelwood, livestock fodder, and fruit production. When local livelihoods benefit directly from planted species, community members remain actively invested in protecting, maintaining, and managing the plantations over time.

89. (D) Local alienation leading to non-cooperation and potential plantation damage
Excluding local communities from afforestation initiatives often leads to social alienation, mistrust, and conflict between villagers and forest authorities. Lacking involvement or direct benefits, local residents may refuse to protect planted areas, leading to uninhibited livestock grazing, accidental or intentional forest fires, and overall plantation failure due to non-cooperation.

90. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Establishing decentralized nurseries through local women's self-help groups is an effective afforestation strategy. Raising saplings locally minimizes transportation distance, reducing sapling transit mortality and distribution costs. Simultaneously, it generates sustainable income and employment for rural women, strengthening community participation in local environmental conservation and afforestation drives.

91. (B) 2014
India became the first nation globally to adopt a comprehensive National Agroforestry Policy in the year 2014. The policy aims to reduce regulatory hurdles, encourage tree planting on farmlands, improve supply chains for wood-based industries, and boost smallholder farmer income through integrated tree and agricultural crop management.

92. (B) Encouraging agroforestry by simplifying tree felling and transit rules
A primary objective of the National Agroforestry Policy, 2014, is encouraging farmers to plant trees on farmlands by simplifying complex legal regulations surrounding tree felling and transit permits. Removing bureaucratic barriers enables farmers to cultivate, harvest, and transport farm-grown timber easily, fostering market participation and expanding tree cover.

93. (A) Sub-Mission on Agroforestry (SMAF)
To implement the objectives of the National Agroforestry Policy, 2014, the Government of India launched the Sub-Mission on Agroforestry (SMAF). This institutional mechanism coordinates financial assistance, capacity building, nursery development, and technical support across states, encouraging farmers to integrate trees with agricultural crops on farm holdings.

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94. (C) Promoting agroforestry for industrial wood supply to relieve pressure on natural forests
The National Agroforestry Policy, 2014, emphasizes promoting farm-grown timber to satisfy industrial raw material demands for paper, pulp, and construction industries. By encouraging farmers to produce commercial

timber on agricultural land, the policy aims to fulfill national wood requirements while relieving heavy logging pressure on natural forest ecosystems.

95. (D) It restricts farmers from integrating livestock into agroforestry systems.
The National Agroforestry Policy, 2014, actively encourages integrated land-use systems, making the restriction of livestock integration an incorrect statement. The policy promotes combining trees, crops, and livestock (agrosilvopastoral systems) to enhance farm productivity, boost organic matter recycling, improve rural livelihoods, and diversify agricultural risk across farming communities.

96. (C) GPS geotagging and mobile apps
Modern forest management increasingly utilizes GPS geotagging and dedicated mobile applications to monitor afforestation projects. Field staff capture geographic coordinates, plant height, and live photographs of saplings, uploading data to central portals. This spatial technology enables real-time tracking, accurate survival assessment, and transparent verification of plantation progress across sites.

97. (B) Percentage of planted saplings remaining alive after a given period
In afforestation project evaluations, 'survival rate' measures the percentage of planted saplings that remain alive and growing after a specified time frame, such as one or three years post-transplanting. This parameter serves as a fundamental indicator of plantation success, site suitability, nursery stock quality, and post-planting maintenance.

98. (D) Daily stock market fluctuations of timber companies
Evaluating the ecological outcome of an afforestation project focuses on natural indicators such as topsoil moisture retention, native biodiversity recovery, biomass carbon storage, and canopy cover development. Short-term stock market fluctuations of private timber companies reflect financial trading market conditions and are irrelevant to site-level ecological health and restoration.

99. (A) Satellite imagery
The Forest Survey of India (FSI) utilizes remote sensing via satellite imagery to assess national forest and tree cover periodically. High-resolution satellite data enables broad-scale spatial mapping, canopy density classification, change detection, and monitoring of large afforestation projects across varied geographic terrains throughout India transparently and efficiently.

100. (A) I and II only
Monitoring afforestation projects involves third-party verification audits for transparency and drone technology for surveying inaccessible plantation grounds. Statement III is incorrect because post-plantation monitoring extends over several years (typically 3 to 5 years) to evaluate sapling establishment, growth progression, and long-term survival rates beyond the initial months.

101. (A) 'Hardening off' via gradual exposure to sunlight and reduced watering
Hardening off is a critical nursery management practice where tender saplings are gradually exposed to full sunlight, fluctuating outdoor temperatures, and reduced watering schedules prior to field transplanting. This conditioning process thickens stem tissues and strengthens root systems, preparing plants to withstand harsh field environments and environmental stress.

102. (D) They prevent root coiling and foster straight downward roots.
Root trainers are specialized containers designed with internal vertical ribs and bottom drainage holes that prevent taproot spiraling or coiling, which commonly occurs in polybags. Air-pruning at the base encourages a vigorous, well-branched root system with a straight downward taproot, ensuring better field establishment, stability, and drought tolerance.

103. (B) Cocopeat and vermicompost
Modern root trainer nurseries prefer a soil-less growing medium comprising cocopeat and vermicompost. Cocopeat provides high water retention capacity, lightness, and excellent root aeration, while vermicompost supplies essential organic nutrients. This lightweight, pathogen-free combination fosters rapid, healthy root development and simplifies sapling handling during nursery production and transportation.

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104. (C) Overcrowding seedlings in seedbeds to maximize quantity over quality.
Overcrowding seedlings in nursery beds is a poor forestry practice because high plant density leads to intense competition for light, water, and nutrients. This competition results in weak, spindly, and disease-prone saplings. Quality production requires proper spacing, early culling of weak stock, and careful grading to yield hardy seedlings.

105. (A) P-4, Q-2, R-3, S-1
Seed treatments like scarification break seed dormancy to ensure uniform germination. Pricking out involves transferring tiny seedlings from germination beds into individual containers. Hardening off prepares nursery plants for field conditions. Grading sorts saplings based on height, vigor, and overall health prior to dispatching them for planting.

106. (A) Japan
The Miyawaki method of afforestation was developed by Japanese botanist Dr. Akira Miyawaki. This ecological restoration technique focuses on planting dense, multi-layered native plant species close together on prepared soil, creating fast-growing, self-sustaining mini-forests that mimic natural forest dynamics within relatively short timeframes in small areas.

107. (B) Ultra-dense planting of multiple native species mimicking natural forest layers
A defining feature of the Miyawaki afforestation method is planting multiple native tree and shrub species at ultra-high density—typically three to five saplings per square meter. This close spacing encourages rapid vertical growth through natural light competition, creating multi-layered, dense ecological canopy structures that mirror mature natural forests.

108. (B) Shrub, sub-tree, tree, and canopy layers
Under the Miyawaki afforestation method, native plant species are selected and planted together to establish four distinct vegetation layers: the main canopy layer, tree layer, sub-tree layer, and lower shrub layer. Combining these structural strata creates a multi-layered ecosystem that maximizes canopy cover and utilizes vertical space efficiently.

109. (A) It creates rapid-growing, self-sustaining dense forests on small land plots.
The primary advantage of the Miyawaki method in urban afforestation is its capability to rapidly establish dense, self-sustaining native forests on small urban land plots. By accelerating plant growth through intense competition and enriched soil preparation, it creates bio-diverse green pockets within cities that mature significantly faster than traditional plantations.

110. (C) I, II and III only
The Miyawaki method involves thorough soil preparation with organic compost and biomass, high-density sapling planting, and becomes virtually self-sustaining after two to three years. Statement IV is incorrect because Miyawaki forests utilize fast-growing native species that attain significant canopy height within ten to twenty years, rather than a century.

111. (D) Restoration of stream flows and enhanced groundwater recharge
Successful afforestation of degraded watersheds provides key long-term hydrological benefits by improving soil structure, increasing organic humus, and facilitating rainwater infiltration. This enhanced infiltration recharges subterranean aquifers, stabilizes local water tables, and restores perennial baseflows in streams, effectively moderating flood risks and maintaining steady water supplies throughout dry seasons.

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112. (C) They bind topsoil, reducing landslides and soil erosion.
In hilly terrains, mature forest root networks provide critical structural soil conservation benefits. Tree roots penetrate deeply into soil layers, physically anchoring loose topsoil to underlying bedrock and binding soil particles together. This root matrix dramatically reduces surface erosion caused by rain runoff and stabilizes slopes against catastrophic landslides.

113. (B) Providing sustainable non-timber forest products like resins, honey, and medicinal plants
Community afforestation on degraded wastelands provides sustainable long-term economic support to rural livelihoods through the continuous extraction of non-timber forest products. Villagers gather valuable items such as wild honey, tree resins, edible fruits, fodder, and medicinal herbs, creating dependable

135. (A) P-2, Q-1, R-3, S-4
Khair wood is used for Katha extraction and traditional medicine. Shisham provides premium hardwood timber for high-grade furniture. Mahua flowers supply food and local beverage ingredients, while its seeds yield vegetable oil. Palash, known as 'Flame of the Forest', serves as a primary host tree for rearing lac insects.

136. (C) Permitting farmers to grow crops alongside young tree saplings during early plantation years
The Taungya system is a historical agroforestry method where landless farmers are permitted to raise agricultural food crops alongside young timber tree saplings during the initial years of plantation establishment. Once tree canopies close and shade out crops, farmers move to a new cleared block to repeat the process.

137. (D) Gujarat
Gujarat was the pioneer state in India to launch and successfully demonstrate the Social Forestry model during the 1970s. The state forest department encouraged tree planting along roadsides, canal banks, village common lands, and private farm boundaries, setting a national benchmark for community-based afforestation programs.

138. (A) Reclaiming saline/alkaline soils - Prosopis juliflora
Prosopis juliflora is exceptionally well-suited for reclaiming degraded saline and alkaline soils (Usar lands) across North India. Its high salt tolerance, rapid establishment, and soil-conditioning root activity gradually reduce soil alkalinity, improve organic matter content, and stabilize degraded landscapes where sensitive indigenous species fail to grow.

139. (B) Converting natural grasslands into unnatural timber monocultures
Poorly planned afforestation that ignores local ecology can produce negative ecological consequences, such as converting native natural grasslands or savanna ecosystems into dense monoculture tree plantations. Destroying specialized grassland habitats harms adapted fauna, reduces regional biodiversity, and alters localized hydrological balances by introducing high water-demanding tree species.

140. (C) I, II and III only
Urban afforestation faces severe challenges, including restricted planting space due to dense infrastructure, elevated air and soil pollution levels harming young saplings, and vandalism or grazing by stray animals. Excessive organic topsoil is not a challenge, as urban soils are typically compacted, nutrient-poor, and highly degraded.

141. (A) Double the extent of diverted forest land
Under Indian compensatory afforestation guidelines, if suitable non-forest land is unavailable, compensatory tree planting must be executed over degraded forest land equal to double the extent of the forest area diverted for non-forest development projects, ensuring net ecological compensation for lost natural forest ecosystems.

142. (C) The quantified value of ecosystem services lost due to forest diversion
Net Present Value (NPV) in forest diversion regulations represents the economic valuation of ecological benefits and ecosystem services—such as carbon storage, water regulation, biodiversity habitat, and soil conservation—lost when forest land is diverted for non-forest uses. User agencies pay this valuation into CAMPA funds for eco-restoration.

143. (D) Digging deep trenches or contour bunds to retain rainwater
Digging contour trenches or bunds is a highly effective rainwater harvesting technique for establishing plantations on degraded, moisture-deficient lands. These earthen structures intercept surface runoff during rains, trapping water near sapling roots, facilitating deep moisture percolation, preventing topsoil erosion, and drastically increasing sapling survival rates in dry environments.

144. (C) Rosin and Turpentine
Rosin and turpentine are non-timber forest products derived from harvesting the oleoresin of Chir Pine (Pinus roxburghii) trees in the Himalayan foothills. Tapping pine resin provides sustainable rural economic returns and raw material for chemical industries, making resin-yielding pine species popular components in hill forestry models.

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and tree cover of the state reaches nearly 9.23 percent.

125. (A) Open Forest
In the forest density classification used by the Forest Survey of India (FSI), OF stands for Open Forest. Open Forests are defined as lands with tree canopy density ranging between 10 percent and 40 percent, distinguishing them from Very Dense Forests (VDF) and Moderately Dense Forests (MDF).

126. (C) Roots create soil channels and humus reduces runoff, enhancing rainwater percolation
Afforestation enhances groundwater recharge primarily through subterranean root activity and organic humus accumulation. Tree root systems create macropores in the soil profile, while organic leaf litter holds rainwater, slowing down surface runoff. This structural combination promotes deep percolation of rainwater into underlying aquifers during precipitation events.

127. (D) Humus formation enhancing soil porosity and water retention
Leaf litter decomposing on the forest floor facilitates humus formation, which plays a vital role in water conservation. Humus improves soil structure by binding mineral particles into aggregates, increasing soil porosity, enhancing water infiltration rates, and expanding topsoil moisture retention capacity in newly afforested areas.

128. (C) Delaying and lowering peak river flow volumes to reduce flood risks
Reducing "peak flow" in watershed management refers to delaying and lowering the maximum volume of surface water runoff reaching river channels during intense rainfall. Forest canopies and root systems absorb and retard surface runoff, flattening peak discharge curves and mitigating severe flash flooding downstream.

129. (B) All tree plantations inherently increase surface runoff compared to barren concrete land.
Stating that tree plantations increase surface runoff compared to barren concrete land is factually incorrect. Tree foliage intercepts rainfall, while roots and organic forest floor litter promote soil infiltration. Consequently, established forest plantations significantly reduce surface water runoff and soil erosion compared to impervious concrete or bare land surfaces.

130. (A) I and II only
Forest canopies reduce the kinetic impact of rainfall on soil, and leaf litter acts as a moisture-retaining sponge that releases water slowly. Statement III is incorrect because deep-rooted native trees generally balance local hydrology rather than acting as destructive pumps that dry out aquifers across all climatic environments.

131. (A) Joint Forest Management Committee (JFMC)
Under the National Afforestation Programme (NAP), the Joint Forest Management Committee (JFMC) serves as the primary grass-roots implementation institution at the village level. Comprising local village members and forest department representatives, the JFMC plans, executes, and manages afforestation and eco-restoration projects on village-adjacent degraded forest lands.

132. (C) The science of controlling forest establishment, growth, composition, and health
Silviculture is defined as the science and art of controlling the establishment, growth, composition, health, and quality of forests to meet diverse ecological and economic needs. It involves silvics knowledge, seed handling, nursery management, thinning operations, pruning, and harvesting techniques to ensure sustainable forest management and regeneration.

133. (A) Windbreaks or shelterbelts
Planting rows of trees perpendicular to the prevailing wind direction is termed creating windbreaks or shelterbelts. These vegetative barriers reduce wind speed across adjacent fields, protecting sensitive crops from mechanical lodging, minimizing wind erosion of topsoil, and reducing crop evapotranspiration water loss in open agricultural landscapes.

134. (D) Alley cropping
Alley cropping is an agroforestry system where annual agricultural crops are cultivated in the open alleys between parallel rows of planted trees or woody hedges. Regular pruning of the woody hedgerows provides organic green manure, reduces shade competition, improves soil fertility, and controls surface water erosion between crop rows.

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arrival and growth of secondary climax tree species.

155. (B) A reservoir absorbing and storing atmospheric carbon via biological mechanisms
In afforestation contexts, a "Carbon Sink" is a natural reservoir—such as a growing forest or healthy soil system—that absorbs more atmospheric carbon dioxide through photosynthesis than it releases through decay and respiration. Biological carbon sinks trap carbon long-term within wood biomass, mitigating atmospheric greenhouse gas accumulation.

156. (B) Addition of nitrogen-rich organic mulch to crops from pruned branches
Practicing Alley Cropping with leguminous shrubs provides significant agricultural benefits through regular hedgerow pruning. The pruned green branches and leaves are incorporated into adjacent crop rows as nitrogen-rich organic mulch. This green manure decomposes, enriching soil nitrogen content, improving organic matter, retaining soil moisture, and suppressing unwanted weed growth.

157. (A) Ashoka tree (Saraca asoca)
The Ashoka tree (Saraca asoca) is recognized as the official State Tree of Uttar Pradesh. Renowned for its beautiful evergreen foliage, vibrant medicinal properties, and cultural significance, Ashoka is frequently prioritized alongside other native trees in regional afforestation campaigns and cultural plantation drives across the state.

158. (C) Planting along roads, canal banks, railways, and village common lands
Extension Forestry is a core branch of Social Forestry that involves raising tree plantations on public and community lands situated outside traditional forest boundaries. Key areas include roadsides, canal banks, railway line strips, and uncultivated village common lands, expanding territorial green cover and providing community non-timber forest produce.

159. (D) Seedlings require regular and assured irrigation for survival
Establishing a forest nursery near a reliable perennial water source is critical because tender seedlings require regular, uniform, and assured irrigation to germinate and survive. Uninterrupted access to quality water prevents seedling desiccation, supports optimal nursery growth, and maintains healthy root system development before field transplanting.

160. (C) Protecting tender saplings from direct sun, heavy rain, and temperature swings
Constructing shade houses or green net structures in forest nurseries protects tender growing saplings from extreme environmental conditions. These structures filter scorching direct sunlight, buffer seedlings against heavy rain impact, reduce moisture evapotranspiration, and moderate ambient temperature fluctuations, creating a controlled microclimate for optimal early plant development.

161. (B) A deep taproot and extensive lateral roots to anchor soil
Tree species selected for afforestation in areas vulnerable to severe wind erosion require a deep taproot combined with extensive lateral root networks. Deep taproots anchor trees firmly against strong wind throw, while spreading lateral root systems bind surface topsoil, preventing wind desiccation and mitigating soil loss across dry landscapes.

162. (D) Secure tenure rights incentivize forest communities to protect and regenerate local resources.
The Forest Rights Act (FRA), 2006, enhances forest conservation by granting statutory community tenure and management rights over forest resources to indigenous tribal dwellers. Securing land rights incentivizes local communities to protect, manage, and regenerate local forest ecosystems, leveraging traditional ecological knowledge to prevent illegal deforestation and land degradation.

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163. (A) Vegetative cuttings of a superior parent tree for identical genetic traits
Clonal forestry involves mass-propagating trees using vegetative cuttings, tissue culture, or grafting from selected superior parent plants. This process produces genetically identical offspring (clones) that retain desirable parent traits—such as rapid growth, disease resistance, and straight trunk form—ensuring uniform timber quality and higher yields across industrial tree plantations.

145. (B) Silvopasture
Silvopasture is an integrated agroforestry practice combining deliberate management of trees, forage pasture grasses, and livestock grazing on the same land unit. Growing palatable grasses under open tree canopies provides sustainable livestock grazing, improves soil organic matter through manure recycling, and yields commercial timber or fuelwood products simultaneously.

146. (D) It sheds leaves in winter, letting sunlight reach winter crops underneath
Farmers in Western Uttar Pradesh and Punjab favor Poplar (Populus deltoides) for agroforestry because it is winter-deciduous. Poplar sheds its leaves during winter, allowing unshaded solar radiation to reach underlying rabi crops like wheat, thereby minimizing shade competition during the primary crop growth season while yielding valuable timber.

147. (A) Pruning tree tops and upper branches above the reach of grazing animals
Pollarding is a silvicultural pruning technique where the main stem or top branches of a young tree are cut back at a height above the reach of browsing livestock. This practice stimulates dense growth of young shoots, producing regular yields of fodder, small poles, and fuelwood while protecting foliage from animals.

148. (C) Khejri (Prosopis cineraria)
Khejri (Prosopis cineraria) is revered as the 'Kalpavriksha' of arid Indian landscapes, particularly in Rajasthan. Its deep taproot system allows it to thrive in desert conditions without competing with crops. It provides nitrogen-rich fodder, edible pods (Sangri), fuelwood, and structural timber while stabilizing sand dunes and enriching surrounding topsoil.

149. (A) Sandalwood (Santalum album)
Sandalwood is distinct from Eucalyptus, Bamboo, and Subabul regarding primary industrial forestry utility. While Eucalyptus, Bamboo, and Subabul are fast-growing species raised on short rotations to supply high-volume industrial paper pulp and timber, Sandalwood is a slow-growing hemi-parasitic hardwood prized specifically for its fragrant heartwood and essential oil extraction.

150. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Cultivating bamboo is strongly recommended for stabilizing degraded ravine landscapes, such as the Chambal region. Bamboo possesses an extensive, dense, and interconnected fibrous rhizome root network that effectively binds soil particles together, holding topsoil in place, absorbing runoff impact, and rapidly arresting the progression of gully erosion along ravines.

151. (B) Lack of post-planting care, watering, and protection from animals
The main factor contributing to low sapling survival rates in mass afforestation drives is the lack of post-planting maintenance, regular watering, and physical protection against livestock grazing. Planting millions of saplings during campaigns achieves little long-term success without sustained weeding, protection, and monitoring during the critical establishment years.

152. (C) A model where citizens plant trees in memory of loved ones, encouraging personal care
Under the Uttar Pradesh Afforestation Policy, "Smriti Vatikas" (memorial groves) are established to foster emotional connection and civic responsibility toward tree planting. Citizens plant saplings in memory of departed family members or special occasions, encouraging individual post-planting care, continuous watering, and long-term protection of trees through personal emotional investment.

153. (D) Eucalyptus
The traditional "Panchavati" plantation comprises five sacred indigenous trees: Peepal, Banyan, Bael, Aonla, and Ashoka (or Neem). Eucalyptus is a fast-growing exotic species introduced from Australia for commercial timber and pulp, making it completely excluded from the traditional, culturally revered Panchavati tree groupings in Indian forestry.

154. (A) A hardy species colonizing degraded land to improve soil for later species
A pioneer species in ecological restoration is a hardy, stress-tolerant plant species that colonizes barren or degraded landscapes first. Pioneer species withstand harsh conditions, fix atmospheric nitrogen, build soil organic matter, and create favorable microclimates, establishing ecological conditions suitable for the subsequent

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local household income without compromising standing forest canopy.

114. (D) Enhanced ecosystem services like pollination and natural pest control for nearby farmlands
A major long-term intangible economic benefit of afforestation is the provision of essential ecosystem services to surrounding agricultural systems. Forests host wild insect pollinators that increase crop yields and harbor natural predatory species that control agricultural pests, thereby boosting overall farm productivity without direct chemical management expenditure.

115. (A) IV, II, III, I
The development of an afforestation project progresses chronologically: initial establishment and sapling survival (IV), followed by soil binding and runoff reduction (II). Over time, leaf litter decomposition accumulates soil organic matter (III), culminating long-term in the establishment of a self-sustaining climax forest ecosystem (I).

116. (C) A type of giant grass
Botanically, bamboo is classified as a giant perennial grass belonging to the family Poaceae. Although it develops woody, tall, stem-like structures called culms, it lacks true secondary wooden growth characteristic of trees, exhibiting rapid growth rates and hollow jointed stems typical of the grass family.

117. (A) Exempting non-forest bamboo from felling and transit permits to encourage cultivation
The Indian Forest Act was amended in 2017 to remove bamboo grown on non-forest lands from the legal definition of a 'tree'. This regulatory change exempts farm-grown bamboo from cumbersome felling and transit permit requirements, encouraging farmers to cultivate bamboo in agroforestry systems and supply commercial markets freely.

118. (D) Fast growth, continuous harvesting without replanting, and effective soil erosion control
Bamboo is an exceptional agroforestry component because of its ultra-rapid growth, deep rhizomatous root network that locks soil against erosion, and capacity for selective harvesting without killing the plant. Once established, bamboo culms can be harvested continuously for decades, providing regular financial income and soil conservation benefits.

119. (B) Hortisilviculture
Integrating fruit-bearing horticultural trees with forestry species or agricultural crops within an agroforestry land management system is specifically termed hortisilviculture (or horti-agrisilviculture). This practice allows farmers to produce commercial timber alongside regular seasonal fruit harvests, boosting household nutrition and generating steady farm revenue across variable harvesting cycles.

120. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Integrating fruit trees like Mango, Guava, or Amla in agro-forestry provides early and recurring income to farming households compared to timber species. Fruit trees possess a substantially shorter gestation period before yielding harvestable produce, generating annual market revenue long before timber species reach their final commercial rotation age.

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121. (D) 24.62%
According to the India State of Forest Report (ISFR) 2021 published by the Forest Survey of India, the total forest and tree cover of India stands at 80.9 million hectares. This combined cover accounts for approximately 24.62 percent of the country's total geographical area.

122. (A) Madhya Pradesh
According to the India State of Forest Report (ISFR) 2021, Madhya Pradesh has the largest area under forest cover among all states in India. It is followed by Arunachal Pradesh, Chhattisgarh, Odisha, and Maharashtra in terms of total absolute forest area within state boundaries.

123. (B) 33%
The National Forest Policy of India (1988) sets a national target of maintaining a minimum of 33 percent of the country's total geographical area under forest and tree cover. This goal aims to ensure ecological stability, conserve natural biodiversity, protect water resources, and prevent soil land degradation nationwide.

124. (B) 6.15%
According to data from the India State of Forest Report (ISFR) 2021, the recorded forest cover of Uttar Pradesh is approximately 6.15 percent of its total geographical area. When combined with tree cover outside forests, the total forest

164. (C) Creating green spaces offering aesthetic beauty and recreation for urban populations
Recreation or Aesthetic Forestry, a sub-branch of social forestry, focuses on designing, planting, and maintaining trees, ornamental shrubs, and green spaces in and around urban centers. Its primary objective is creating visually pleasing landscapes, urban parks, and recreational forest belts that improve public wellbeing, reduce pollution, and enhance urban quality of life.

165. (A) Food forest / multi-strata system
A food forest or multi-strata agroforestry system is a sustainable land management design that integrates edible fruit trees, timber species, shrubs, perennial vegetables, and ground cover crops in multi-layered canopy structures mimicking natural forest architecture. This multi-tiered arrangement optimizes sunlight utilization, builds soil humus, and provides continuous diverse harvests.

166. (D) Weeds compete with saplings for moisture, nutrients, and light.
Regular weeding during the first two years of an afforestation project is essential because aggressive weed vegetation competes directly with young saplings for essential soil moisture, nutrients, and sunlight. Timely weed removal eliminates resource competition, prevents sapling smothering, reduces pest harborage, and significantly enhances sapling growth rates and overall survival.

167. (B) The duration between planting and final harvest for optimal economic return
In industrial forestry, "Rotation Period" refers to the planned timeframe between initial forest establishment or planting and final timber clear-felling. This duration is calculated to optimize financial returns or wood volume yield based on species growth rates, target log dimensions, and specific industrial manufacturing requirements for paper or timber.

168. (C) High water table and occasional waterlogging
The Terai region is characterized by a high groundwater table, marshy soils, and occasional surface waterlogging during the monsoon season. Tree species chosen for afforestation in the Terai belt must possess physiological adaptations to tolerate saturated root zones, poor soil aeration, and periodic inundation without suffering from root rot or mortality.

169. (D) Farm forestry is on private farm lands; extension forestry is on public/community lands.
Within Social Forestry, the key distinction between Farm Forestry and Extension Forestry lies in land ownership. Farm Forestry involves individual farmers raising trees on private agricultural farmlands or boundaries for personal or commercial use. In contrast, Extension Forestry establishes tree plantations on public and community lands, such as roadsides and canals.

170. (A) Increasing forest cover, improving ecosystem services, and boosting livelihoods while curbing climate change
The holistic goal of the Green India Mission (GIM) is expanding and restoring national forest and tree cover, enhancing essential ecosystem services like carbon sequestration and hydrological regulation, and boosting forest-based livelihood options for millions of rural households, thereby serving as a key strategy for climate change mitigation and adaptation.

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CHAPTER 08

Challenges and Prevention of Forest Disasters

1. Which of the following is considered the most common natural cause of forest fires globally, though it accounts for a minor percentage of fires in India?
(A) Volcanic eruptions
(B) Lightning strikes
(C) Friction between rolling stones
(D) Rubbing of dry bamboo stems

2. Which of the following is not a standard pre-fire management technique used in Indian forests?
(A) Controlled burning of dry litter
(B) Creation and maintenance of fire lines
(C) Clearing of dry biomass along forest roads
(D) Aerial dropping of chemical fire retardants as a preventive measure

3. Among the major types of forest disasters, which of the following primarily causes the dieback of trees through gradual defoliation and disruption of sap flow?
(A) Pest and disease infestation
(B) Surface fire
(C) Flash flood
(D) Meteorological drought

4. Read Statement I and Statement II carefully and select the correct option.
Statement I: Prolonged droughts weaken trees, making them more susceptible to bark beetle infestations.
Statement II: Reduced moisture in trees lowers their ability to produce sap, which is a natural defense mechanism against boring insects.
(A) Statement I is correct but Statement II is incorrect.
(B) Statement I is incorrect but Statement II is correct.
(C) Both statements are correct and Statement II explains Statement I.
(D) Both statements are correct but Statement II does not explain Statement I.

5. In the context of forest ecology, what is the primary negative impact of severe landslides on forested hill slopes?
(A) Complete removal of topsoil and the native seed bank
(B) Temporary increase in local groundwater table levels
(C) Rapid proliferation of climax tree species on slopes
(D) Long-term enhancement of soil carbon sequestration

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6. What is the most significant way climate change increases the frequency of forest disasters like fires?
(A) By decreasing overall atmospheric concentrations of carbon dioxide
(B) By reducing average speeds of surface winds during summer months
(C) By significantly accelerating decomposition rates of forest litter
(D) By increasing dry spell durations and raising average temperatures

7. Illegal felling and encroachment in forest areas primarily lead to which of the following secondary disasters?
(A) Substantial increase in the frequency of geological earthquakes
(B) Fragmentation of wildlife habitats and human-wildlife conflict
(C) Unnatural and rapid elevation of local groundwater table levels
(D) Enhanced natural regeneration of broad-leaved forest species

8. Find the odd one out regarding the tools used for early warning and monitoring of forest fires.
(A) MODIS sensor
(B) VIIRS sensor
(C) Seismograph
(D) Forest Survey of India (FSI) FAST alerts

9. Which satellite-based system is primarily utilized by the Forest Survey of India (FSI) to detect active forest fires in near real-time?
(A) Cartosat-3 satellite imaging system
(B) GSAT-31 communication satellite system
(C) IRNSS (NavIC) regional navigation system
(D) SNPP-VIIRS and Aqua/Terra-MODIS sensors

10. Consider the following statements regarding the preparation of a Forest Disaster Management Plan:
I. It must include a vulnerability and risk assessment of the forest division.
II. It allocates specific roles only to the State Disaster Response Force (SDRF) and excludes forest staff.
III. It incorporates standard operating procedures (SOPs) for pre-disaster, during-disaster, and post-disaster phases.
Which of the above statements represents the correct combination?
(A) I and III only
(B) I and II only
(C) II and III only
(D) I, II, and III

11. What is the primary role of the National Disaster Management Authority (NDMA) in the context of forest fires in India?
(A) To directly extinguish active forest fires across states using NDRF teams
(B) To issue national guidelines and frameworks for forest fire management
(C) To arrest and prosecute individuals involved in forest encroachments
(D) To distribute financial compensation directly to affected communities

12. In Uttar Pradesh, which of the following forest regions is most highly prone to forest fires during the dry summer months due to its dry deciduous nature?
(A) Mangrove forests of the lower Gangetic delta region
(B) Vindhyan forest ranges in Sonbhadra and Mirzapur
(C) Tropical wet evergreen forest belts of the Terai
(D) Riverine flood-plain forests along Gomti river

13. What is the primary purpose of constructing a "fire line" in a forest?
(A) To clear a vegetation gap to halt or slow surface fire spread
(B) To serve as an emergency landing strip for surveillance drones
(C) To mark territorial boundaries of encroached forest divisions
(D) To provide a designated access path for timber transport trucks

14. Which of the following is the most appropriate method to ensure the effective participation of local communities in forest fire control?
(A) Imposing heavy financial penalties on entire fringe villages whenever forest fires occur
(B) Banning all entry of local tribal communities into surrounding forests throughout the year
(C) Forming Joint Forest Management Committees (JFMCs) with local training and incentives
(D) Relocating all human settlements situated near forest boundaries to distant urban zones

15. Read the following Assertion and Reason carefully and select the correct option.
Assertion (A): Severe forest fires can lead to an immediate decline in local populations of slow-moving reptiles and ground-nesting birds.
Reason (R): These species lack the mobility to escape rapidly advancing surface and crown fires.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

16. Post-disaster restoration of a burnt forest area generally prioritizes which of the following activities?
(A) Immediate construction of concrete retaining structures across the entire burnt region
(B) Planting fast-growing exotic timber plantations to recover economic losses rapidly
(C) Implementing soil and moisture conservation alongside native species regeneration
(D) Complete paving of affected soil surfaces to prevent future forest fire occurrences

17. A climate-resilient forest management strategy must necessarily include:
(A) Promotion of extensive monoculture plantations to ensure uniform timber growth

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wildlife after a fire) are usually facilitated through:
(A) State government compensation schemes and rural crop insurance (PMFBY)
(B) Emergency relief mandates issued by the United Nations Security Council
(C) World Bank financial programs providing direct cash transfers to farmers
(D) Private non-governmental wildlife conservation organizations operating locally

52. Which invasive weed is notorious for invading degraded forest lands in the Shivalik and Vindhyan regions of UP, inhibiting native tree regeneration and acting as a severe fire hazard?
(A) Neem (Azadirachta indica)
(B) Banyan (Ficus benghalensis)
(C) Lantana (Lantana camara)
(D) Sal (Shorea robusta)

53. International technical exchange in forest disaster management has promoted the use of which modern tool for modeling fire spread behavior?
(A) Fire behavior prediction software like FARSITE or Prometheus
(B) High-altitude atmospheric weather balloon monitoring arrays
(C) Continuous ground-motion tracking mechanical seismographs
(D) Chemical soil acidity assessment via litmus paper testing

54. Identify the correct statement regarding man-made forest disasters.
(A) They represent completely uncontrollable and unpredictable natural events across landscapes
(B) Encroachment activities generally enhance overall species biodiversity within core forest zones
(C) Anthropogenic fires occur exclusively during wet monsoon months due to high humidity levels
(D) Illegal mining causes severe soil erosion, habitat fragmentation, and heavy metal pollution

55. Match List I with List II and select the correct option.
List I:
P. Ground fire
Q. Surface fire
R. Crown fire
S. Spot fire

List II:
1. Spreads through the tops of trees, highly destructive
2. Burns organic matter beneath the soil surface, slow and smoky
3. New ignitions caused by flying embers ahead of the main fire
4. Burns dry leaves and undergrowth, most common in India

(A) P-4, Q-2, R-3, S-1
(B) P-2, Q-4, R-1, S-3
(C) P-1, Q-3, R-2, S-4
(D) P-2, Q-1, R-4, S-3

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56. Which of the following management practices is most effective in preventing pest outbreaks in a managed forest?
(A) Promoting extensive monoculture plantations of fast-growing exotic tree species
(B) Completely eradicating all species of insectivorous birds from forest habitats
(C) Maintaining structural canopy diversity and a mix of native tree species
(D) Harvesting all standing commercial trees before they reach ten years of age

57. During periods of severe drought in Uttar Pradesh, the forest department often fills artificial waterholes. What is the primary ecological purpose of this action?
(A) To establish designated artificial breeding grounds for beneficial aquatic insects
(B) To artificially increase regional atmospheric humidity levels to induce early rainfall
(C) To supply continuous irrigation water for illegal agricultural encroachment plots
(D) To prevent wildlife mortality and mitigate human-wildlife conflict during droughts

58. Ecological damage caused by the 'Sal borer' insect in the forests of central and northern India is primarily an example of:
(A) A biological disaster
(B) A geological disaster
(C) A hydrological disaster
(D) A meteorological disaster

59. What happens to the soil structure immediately after a high-intensity forest fire?
(A) Topsoil becomes exceptionally porous, substantially increasing deep ground water infiltration rates
(B) Organic matter is destroyed, creating a hydrophobic layer that increases surface

2. Long-term measures to restore the ecosystem and livelihood
3. Steps taken to reduce the severity or likelihood of a disaster before it occurs
4. Planning, training, and early warning setup before a disaster hits

(A) P-4, Q-3, R-2, S-1
(B) P-3, Q-1, R-4, S-2
(C) P-2, Q-4, R-1, S-3
(D) P-3, Q-4, R-1, S-2

26. In recent years, data from the Forest Survey of India has shown that which specific region of Uttar Pradesh is particularly vulnerable to man-made surface fires triggered by the collection of Non-Timber Forest Products (NTFPs) like Mahua?
(A) Kaimur Wildlife Sanctuary and surrounding Vindhyan ranges
(B) Dudhwa Tiger Reserve and adjacent protected forest corridors
(C) National Chambal Sanctuary along the tri-state river basin
(D) Hastinapur Wildlife Sanctuary within the upper Gangetic basin

27. International cooperation in forest disaster management often involves the exchange of technical expertise. Which global framework primarily guides disaster risk reduction efforts, including forest fires?
(A) The Kyoto Protocol on Climate and Emissions Reduction
(B) The Sendai Framework for Disaster Risk Reduction
(C) The Montreal Protocol on Ozone Layer Depleting Substances
(D) The Basel Convention on Transboundary Hazardous Wastes

28. Which type of forest fire is the most difficult to control, spreads rapidly through the canopy, and causes the maximum mortality of mature trees?
(A) Surface fire
(B) Crown fire
(C) Ground fire
(D) Creeping fire

29. A significant man-made cause of forest fires in rural India is the intentional burning of forest floors to:
(A) Promote a fresh flush of green grass for livestock grazing
(B) Permanently eliminate all excess carbon dioxide from the soil
(C) Rapidly increase the overall height of the commercial canopy
(D) Artificially reduce the annual amount of rainfall in the area

30. Select the correct logical sequence of actions in satellite-based forest fire alert systems:
(A) Satellite detects thermal anomaly → FSI processes data → Alert SMS sent to field staff → Ground verification and firefighting
(B) Ground verification → FSI processes data → Satellite detects anomaly → Alert SMS sent
(C) Alert SMS sent → Satellite detects anomaly → FSI processes data → Ground verification
(D) FSI processes data → Ground verification → Alert SMS sent → Satellite detects anomaly

31. Which of the following pests is known to cause severe defoliation in Teak (Tectona grandis) forests, leading to significant ecological and economic damage?
(A) Sal borer (Hoplocerambyx spinicornis)
(B) Pine shoot beetle
(C) Desert locust
(D) Teak defoliator (Hyblaea puera)

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32. Flash floods in forested catchments are often exacerbated by which of the following pre-existing conditions?
(A) Exceptionally high structural density of dense forest floor undergrowth
(B) Deep and expansive root systems of long-established native broadleaf trees
(C) Recent forest fires destroying vegetation and causing soil hydrophobicity
(D) Widespread presence of naturally constructed check dams along stream channels

33. The 'Dieback' phenomenon in forests, which can lead to large-scale ecological disaster, is primarily linked to:
(A) Excessive addition of rich organic compost to the local forest floor
(B) Complex interactions of prolonged drought, heat, and pest attacks
(C) High levels of natural seedling regeneration occurring within canopy gaps
(D) Over-proliferation and rapid population expansion of native apex predators

34. In Uttar Pradesh, the illegal extraction of which high-value resource often drives organized

encroachment and subsequent degradation in the Terai forest belt?
(A) Sandalwood timber
(B) Red Sanders wood
(C) Iron ore deposits
(D) Sal and Teak timber

35. The 'MODIS' sensor, frequently mentioned in forest fire monitoring, is aboard which series of satellites?
(A) Terra and Aqua
(B) INSAT series
(C) Landsat grid
(D) Sentinel unit

36. Which of the following correctly describes a 'Ground Fire' in forest ecology?
(A) A fire that burns upper canopy crowns and jumps rapidly between tree tops
(B) A fast-moving surface fire that consumes loose dry leaf litter and debris
(C) A slow, smoldering fire burning thick organic matter below the surface
(D) A localized fire restricted entirely to outer bark layers of single trees

37. Which state-level body is responsible for coordinating disaster management activities, including large-scale forest fires, in Uttar Pradesh?
(A) UP State Disaster Management Authority (UPSDMA)
(B) UP Forest Corporation (UPFC) administrative division
(C) UP State Pollution Control Board (UPPCB) environment wing
(D) UP State Biodiversity Board (UPBB) conservation council

38. The Suhelwa Wildlife Sanctuary in Uttar Pradesh is prone to anthropogenic pressures. Which of the following constitutes a major man-made disaster risk for this specific habitat?
(A) Large-scale open-cast mining of coal deposits
(B) Frequent high-altitude snow and rock avalanches
(C) Marine coastal erosion along shoreline fringes
(D) Organized illegal timber felling and smuggling

39. Identify the incorrect statement regarding the construction of fire lines.
(A) Fire lines must be cleared of all combustible material before the onset of the fire season.
(B) Fire lines should be planted with highly resinous trees to absorb the heat.
(C) Natural barriers like rivers and rocky outcrops can act as natural fire lines.
(D) The width of a fire line depends on the forest type, topography, and fuel load.

40. Consider the following statements about the role of local communities in disaster management:
I. Indigenous knowledge often helps in predicting local drought cycles and fire behavior.
II. Under the Forest Rights Act 2006, forest-dwelling communities have no responsibility to protect the forest from fires.
III. Joint Forest Management (JFM) involves sharing forest benefits with communities in return for their help in protection against disasters.
Which of the above combination of statements is correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

41. A major impact of severe forest floods in protected areas like the Dudhwa National Park is:
(A) Permanent and complete extinction of all native aquatic species in floodwaters
(B) Immediate desertification of extensive low-lying flooded grassland habitats
(C) Absolute halt to all natural plant growth and seed germination for decades
(D) Displacement of wildlife, increasing human-wildlife conflict at forest edges

42. Following a massive pest infestation that kills a large patch of forest, what is the recommended silvicultural practice for restoration?
(A) Salvage logging of dead timber followed by native species reafforestation
(B) Intentionally setting the entire affected compartment on fire to sterilize topsoil
(C) Leaving all dead trees untouched permanently to serve as standing fuel hazards
(D) Formally converting degraded forest tracts into private commercial agricultural plots

43. Which of the following is a primary characteristic of a climate-resilient forest?
(A) Exclusive composition of a single, highly

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productive exotic fast-growing tree species
(B) High structural and genetic diversity enabling recovery from extreme weather events
(C) Continuous and complete dependence on artificial industrial irrigation networks
(D) Total absence of any periodic natural disturbances like minor localized surface fires

44. To scientifically map forest disaster risk, the Forest Survey of India overlays various spatial data layers. Which layer is NOT typically relevant for fire risk mapping?
(A) Vegetation type and fuel load density
(B) Oceanic tectonic plate boundaries
(C) Topography (slope and aspect)
(D) Proximity to roads and human settlements

45. Read the following Assertion and Reason carefully and select the correct option.
Assertion (A): Invasive alien species like Prosopis juliflora can drastically alter the local ecology and hydrology of an area.
Reason (R): They have deep taproots that aggressively deplete groundwater and allelopathic properties that suppress the growth of native flora.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

46. Under the Disaster Management Act, 2005, which authority at the district level is fundamentally responsible for preparing the District Disaster Management Plan, including forest disaster protocols?
(A) The District Forest Officer (DFO) alone
(B) The Member of Parliament for the respective district
(C) The District Magistrate (as Chairperson of the DDMA)
(D) The Chief Minister

47. What is the traditional method used by forest staff to stop a rapidly advancing large forest fire when direct water application is impossible?
(A) Spraying high-pressure compressed nitrogen gas continuously over tree canopies
(B) Rapidly digging deep subterranean defense tunnels directly below active fire zones
(C) Systematically felling all mature standing trees within a ten-kilometer radius
(D) Executing controlled counter-firing or back-burning operations from secure baselines

48. During a massive forest fire, the release of which pollutant poses an immediate, acute health hazard to frontline forest staff and nearby communities?
(A) Chlorofluorocarbon emissions and synthetic coolants
(B) Concentrated sulphuric acid vapors from chemical spills
(C) Carbon monoxide (CO) gas and fine particulate matter
(D) Radioactive radon gas emitted from soil disturbances

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49. How are Unmanned Aerial Vehicles (UAVs / Drones) most effectively utilized during an ongoing forest fire disaster?
(A) For conducting large-scale emergency air-lifting and mass transport of evacuated wild animals
(B) To provide real-time thermal imagery of fire fronts and hotspots through smoke
(C) To drop hundreds of thousands of liters of water like large specialized fixed-wing air tankers
(D) To automatically dig continuous bare-soil fire lines along inaccessible steep mountain slopes

50. Consider the following statements about drought management in forest ecosystems:
I. Creating waterholes and wildlife guzzlers prevents animals from migrating into human settlements during droughts.
II. Silvicultural thinning can reduce competition for water among the remaining trees.
III. Drought conditions generally decrease the risk of forest fires due to a lack of atmospheric moisture.
IV. Afforestation with drought-tolerant native species is a long-term mitigation strategy.
Which of the above combination of statements is correct?
(A) I, II, and III only
(B) II, III, and IV only
(C) I, III, and IV only
(D) I, II, and IV only

51. Insurance mechanisms for communities affected by forest disasters (like crop raiding by displaced

(B) Enhancing species diversity and focusing on drought-resistant native taxa
(C) Complete chemical elimination of undergrowth across vulnerable forest patches
(D) Disconnecting contiguous forest habitats to prevent spreading exotic diseases

18. In scientific forest disaster risk assessment, the "Fire Danger Rating System" generally uses which combination of variables to predict fire risk?
(A) Lunar cycle phases, surface soil coloration, and wildlife population density
(B) Spatial distance from urban centers and total number of deployed forest guards
(C) Average tree canopy height, bark thickness layers, and root system depth
(D) Temperature, relative humidity level, surface wind speed, and fuel moisture

19. How do invasive alien species like Lantana camara primarily increase the threat of forest disasters?
(A) By serving as combustible ladder fuel facilitating crown fires
(B) By releasing substantial quantities of ozone-depleting atmospheric gases
(C) By increasing soil moisture levels to cause extensive tree root rot
(D) By attracting frequent lightning strikes during intense thunderstorms

20. Consider the following statements regarding the National Action Plan on Forest Fires (NAPFF) in India:
I. It aims to minimize forest fires by informing, enabling, and empowering forest fringe communities.
II. It advocates the complete abolition of the traditional practice of controlled burning.
III. It emphasizes the use of modern technology for early warning and fire mapping.
IV. It restricts state forest departments from seeking assistance from other states.
Which of the above statements represent the correct combination?
(A) II and IV only
(B) I, II, and III only
(C) I and III only
(D) I, III, and IV only

21. What is the primary duty of a "fire watcher" appointed by the forest department during the fire season?
(A) To patrol vulnerable forest patches, maintain fire lines, and report early smoke
(B) To independently initiate controlled back-burns without official authorization
(C) To conduct comprehensive wildlife population censuses during active fire events
(D) To calculate total carbon dioxide emissions released from burnt forest biomass

22. Which of the following is a direct impact of large-scale forest fires on air quality and climate?
(A) Rapid decrease in concentrations of atmospheric particulate matter (PM 2.5)
(B) Immediate and widespread reduction in local ambient atmospheric temperatures
(C) Enhanced atmospheric chemical formation of beneficial stratospheric ozone
(D) Massive release of sequestered carbon dioxide and airborne black carbon

23. In modern forest disaster management, how is Geographic Information System (GIS) primarily used?
(A) To physically extinguish forest fires using automated satellite water drops
(B) To map fire-prone zones, analyze burn severity, and plan mitigation strategies
(C) To artificially alter local micro-weather patterns to induce heavy rainfall
(D) To continuously track the real-time movement of ground-nesting wild birds

24. Which of the following drought management strategies directly supports forest conservation?
(A) Extracting maximum available sub-surface groundwater for commercial timber irrigation
(B) Replacing deep-rooted native tree species with shallow-rooted commercial cash crops
(C) Creating continuous contour trenches (CCT) and check dams for soil moisture conservation
(D) Imposing a complete ban on all tree planting and afforestation work until droughts end

25. Match List I with List II and select the correct option.
List I:
P. Mitigation
Q. Preparedness
R. Response
S. Recovery
List II:
1. Actions taken during or immediately after a disaster to save lives and property

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runoff
(C) Soil layers become completely saturated with compressed atmospheric nitrogen gas compounds
(D) Soil rapidly transforms into highly fertile alluvial silt ideal for agricultural production

60. Arrange the following steps of preparing a Forest Disaster Management Plan in the correct chronological order:
I. Identification of vulnerable areas and risk assessment
II. Constitution of the planning committee and stakeholder consultation
III. Approval and mock drill testing of the plan
IV. Drafting the Standard Operating Procedures (SOPs) for response
Which of the following represents the correct order?
(A) I, II, IV, III
(B) II, I, IV, III
(C) II, IV, I, III
(D) I, IV, II, III

61. Climate change alters the 'fire regime' of an area. The term 'fire regime' encompasses which of the following?
(A) The pattern, frequency, intensity, and seasonality of fires in a given ecosystem
(B) The administrative political policies governing state forest boundaries and land use
(C) The annual financial budget allocated by state governments for firefighting equipment
(D) The specific legal penal provisions and judicial fines for setting illegal forest fires

62. Which of the following represents a significant challenge in managing illegal felling (timber smuggling) in dense forests?
(A) Complete absence of commercial market demand for high-value hardwood timber products
(B) Timber smuggling syndicates actively collaborating with all levels of forest departments
(C) Vastness of terrain making continuous physical ground patrolling extremely difficult
(D) Trees in dense natural forest tracts being structurally too small for commercial felling

63. Under the Forest Survey of India's FAST (Forest Fire Alert System), alerts are disseminated based on data sent by ISRO/NASA satellites. How are field-level beat guards usually notified of these alerts?
(A) Through official registered postal mail delivered to forest range offices
(B) Through continuous national television news broadcasts aired across state channels
(C) Through urgent satellite-phone calls initiated directly from central ministry offices
(D) Through automated SMS and email alerts sent directly to registered mobile numbers

64. The 'Pre-Warning' system for forest fires developed by FSI is fundamentally based on:
(A) Continuous real-time thermal anomaly detection combined with ground sensor telemetry inputs
(B) Comprehensive historical tracking data of seasonal wildlife migrations across regional corridors
(C) Forest Fire Danger Rating systems utilizing canopy density, vegetation types, and weather data
(D) Annual summary evaluation reports submitted by local village heads and Panchayats at year-end

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65. The role of the State Disaster Response Force (SDRF) in forest disasters is typically:
(A) To permanently replace state forest departments across all routine administrative and legal duties
(B) To provide specialized rescue and emergency support during catastrophic forest fires or severe floods
(C) To execute seasonal sapling plantation drives across degraded forest beats during monsoon months
(D) To evaluate and issue regulated wildlife hunting permits to local fringe village communities

66. In the context of Uttar Pradesh, why is the Pilibhit Tiger Reserve vulnerable to floods during the monsoon?
(A) It is situated within the dry, rocky plateau terrain of the southern Bundelkhand region
(B) It lies below mean sea level and experiences severe coastal tidal wave inundations
(C) It experiences continuous cyclonic rainfall events throughout all months of the year
(D) It lies in the Terai arc landscape, intersected by Himalayan rivers like the Sharda

67. To prevent the spread of forest fires, forest departments often practice 'controlled burning'. When is this usually carried out?
(A) In winter or early spring before the dry season, during cool morning or evening hours
(B) At the peak of dry summer months, during intense and windy afternoon heat hours
(C) During heavy monsoonal rain events when soil moisture levels are fully saturated
(D) Immediately after an uncontrolled natural surface fire has been reported nearby

68. The concept of 'Joint Forest Management' (JFM) originated in India primarily to:
(A) Completely privatize state forest resources and timber extraction for commercial corporate use
(B) Administratively merge the executive forest departments of two adjacent neighboring states
(C) Involve local fringe village communities in protecting degraded forests on a benefit-sharing basis
(D) Hand over complete legal ownership and administration of all national parks to private NGOs

69. Which specific Schedule of the Wildlife (Protection) Act, 1972 (as amended) lists species that receive the highest level of protection, and whose habitats require stringent defense against disasters?
(A) Schedule I
(B) Schedule III
(C) Schedule IV
(D) Schedule V

70. Consider the following statements regarding the restoration of areas damaged by forest disasters:
I. Natural regeneration should be the first preference where the rootstock is still alive.
II. Artificial planting becomes necessary if the topsoil has been completely sterilized and the seed bank is destroyed.
III. Introducing fast-growing invasive species is the best method to quickly green a burnt landscape.
Which of the above statements is/are correct?
(A) II and III only
(B) I and III only
(C) I only
(D) I and II only

71. How does an increase in the frequency of forest disasters affect the carbon cycle?
(A) It permanently and significantly enhances the long-term carbon sequestration capacity of forest ecosystems
(B) It converts forests from carbon sinks into carbon sources through massive emissions and biomass loss
(C) It completely halts the fundamental biochemical process of plant photosynthesis on a global scale
(D) It produces no scientifically measurable or long-term ecological effect on global carbon cycles

72. Which map serves as the most critical base document for planning risk mitigation in a forest division?
(A) Topographical map showing political boundaries only
(B) Cadastral map of urban properties
(C) Fire vulnerability and hazard zonation map
(D) Global tectonic plate map

73. Which of the following invasive species is highly prevalent in aquatic ecosystems and wetlands within forest areas of UP (like the Ramsar sites), causing ecological damage by choking water bodies?
(A) Vilayati Babul (Prosopis juliflora)
(B) Wild Sage (Lantana camara)
(C) Congress Grass (Parthenium hysterophorus)
(D) Water Hyacinth (Eichhornia crassipes)

74. The Compensatory Afforestation Fund Management and Planning Authority (CAMPA) funds can be utilized for which of the following activities related to forest disasters?
(A) Forest fire control operations and soil-moisture conservation works
(B) Subsidizing domestic urban electricity bills for municipal utility consumers
(C) Constructing commercial shopping malls within protected eco-sensitive zones
(D) Providing low-interest housing loans to permanent forest department personnel

75. Read the following Assertion and Reason carefully and select the correct option.
Assertion (A): Fire watchers are stationed at elevated watchtowers during the summer months in Indian forests.
Reason (R): Early detection of a smoke plume allows for rapid deployment of field staff before

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a surface fire develops into a massive crown fire.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

76. Black carbon emitted from massive forest fires is known to cause which phenomenon when it deposits on Himalayan glaciers?
(A) It substantially increases the reflectivity albedo of glacial ice surfaces, causing them to freeze harder
(B) It decreases ice albedo (reflectivity), absorbing more heat and accelerating glacial melt
(C) It undergoes chemical reactions that rapidly convert surface glacial ice into dense blocks of dry ice
(D) It acts as a thermal insulator, causing high-altitude mountain glaciers to expand rapidly worldwide

77. Which modern technology uses laser pulses emitted from an aircraft to create highly accurate 3D models of the forest canopy and terrain, aiding in assessing fuel loads and landslide risks?
(A) LiDAR (Light Detection and Ranging)
(B) SONAR (Sound Navigation and Ranging)
(C) RADAR (Radio Detection and Ranging)
(D) GPS (Global Positioning System)

78. In the context of drought management in forests, what is a 'guzzler'?
(A) An invasive herbivorous animal that consumes excessive forest foliage
(B) A high-capacity industrial mechanical pump used to drain natural wetlands
(C) An artificial water catchment and storage device providing water for wildlife
(D) A specialized heavy-lift helicopter used exclusively for aerial water bombing

79. Financial assistance to states for disaster response (including severe biological and natural disasters in forests) is primarily routed under NDMA guidelines through the:
(A) Prime Minister's National Relief Fund (PMNRF) and emergency aid channels
(B) Consolidated Revenue Fund managed directly by State Forest Departments
(C) World Wildlife Fund (WWF) international emergency conservation grants
(D) State Disaster Response Fund (SDRF) and National Disaster Response Fund (NDRF)

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80. Consider the following statements about forest fires in Uttar Pradesh:
I. The Terai region rarely experiences fires due to year-round waterlogging.
II. The Vindhyan region experiences the highest number of fire incidents during the pre-monsoon summer.
III. Most forest fires in the state are of natural origin (lightning).
IV. The collection of Mahua flowers and Tendu leaves is a common trigger for human-caused fires.
Which of the above combination of statements is correct?
(A) I, II, and III only
(B) I, III, and IV only
(C) II and IV only
(D) II, III, and IV only

81. Which international organization established the Global Fire Monitoring Center (GFMC) to provide a global portal for wildland fire early warning and monitoring?
(A) World Health Organization (WHO) emergency environment division
(B) International Union for Conservation of Nature (IUCN) with UN support
(C) World Trade Organization (WTO) sustainable development council
(D) International Monetary Fund (IMF) environmental risk facility

82. What is the most dangerous consequence of soil erosion caused by widespread illegal felling on hill slopes?
(A) Unnatural accumulation of highly fertile topsoil layers along hilltops
(B) Spontaneous thermal combustion of exposed subterranean granite bedrock
(C) Rapid and permanent reduction in regional atmospheric greenhouse gases
(D) Increased risk of deadly landslides and debris flows during heavy rains

83. The term 'fuel moisture content' is highly significant in forest fire management. Which of the following statements best defines it?
(A) The ratio of fuel water weight to its oven-dry weight
(B) The total volume of water stored in nearby village ponds

SDRF acts as the state ground response force
(B) NDMA responds exclusively during major flood events, while SDRF handles forest fires
(C) NDMA operates as an independent private NGO, whereas SDRF is a statutory government body
(D) There is no functional or legal difference between them as they represent the same agency

118. Which specific geographic feature makes the Terai region of Uttar Pradesh highly susceptible to flood disasters?
(A) Its geographic location situated entirely along high-altitude trans-Himalayan mountain plateaus
(B) Its immediate coastal proximity to storm surges originating in the deep Arabian Sea basin
(C) Its completely arid, hyper-saline desert soil structure that prevents natural water drainage
(D) Its low-lying flat terrain crossed by rivers descending rapidly from the Himalayas

119. What is an 'artificial fire line'?
(A) A natural water feature such as a perennial river, stream, or deep swamp channel
(B) A cleared vegetation strip maintained by forest departments to halt fire spread
(C) An elevated natural rocky ridge or cliff formation devoid of combustible organic matter
(D) A continuous barrier of synthetic fire-resistant plastic sheeting laid across forest floors

120. Arrange the following actions in the most appropriate sequence for managing a pest outbreak in a forest:
I. Identification of the pest species and mapping the affected area
II. Application of integrated pest management (IPM) controls (biological/chemical)
III. Regular surveillance and early detection of abnormal tree mortality
IV. Post-treatment monitoring and damage assessment
Which of the following represents the correct sequence?
(A) III, I, II, IV
(B) I, II, III, IV
(C) III, II, I, IV
(D) I, III, IV, II

121. The Indian Forest Act of 1927 contains provisions that can be used to prevent disasters by:
(A) Officially permitting unrestricted cattle grazing across all designated reserved forest beats
(B) Actively encouraging the permanent conversion of state forest lands into commercial farmland
(C) Imposing a strict legal ban on utilizing natural river water to extinguish wild forest fires
(D) Penalizing activities like kindling, carrying, or leaving fires burning in Reserved Forests

122. How does the invasion of Lantana camara impact the habitat of herbivores like deer?
(A) It forms thickets replacing edible native grasses, degrading habitat quality
(B) It provides a highly nutritious year-round forage alternative, boosting wild deer numbers
(C) It contains active medicinal compounds that cure chronic viral diseases in wild herbivores
(D) It offers natural systemic immunization against bacterial anthrax outbreaks in wild herds

123. Post-disaster restoration often utilizes "pioneer species". What is a defining characteristic of a pioneer tree species?
(A) It requires deep, nutrient-rich mature soils and dense canopy shade to successfully germinate
(B) It establishes quickly in harsh, degraded, or burnt open environments, stabilizing soil
(C) It survives for thousands of years in climax forests while exhibiting extremely slow growth
(D) It grows exclusively in permanently submerged freshwater aquatic environments and marshes

124. Which climate parameter is the most critical driver for increasing the risk of forest fires during the pre-monsoon season in North India?
(A) Unusually low atmospheric ambient temperatures during spring
(B) High temperature combined with low humidity and strong winds
(C) Abnormally high relative humidity levels across the forest floor
(D) Frequent unseasonal hailstorms occurring in

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(C) Exclusively after a major catastrophic disaster has already occurred
(D) Once every ten years alongside decennial forest management revisals

93. According to NDMA guidelines, which of the following is an essential component of the "Preparedness" phase for forest fires?
(A) Conducting mock drills, checking fire lines, and maintaining equipment
(B) Executing post-fire ecological damage assessments and compensation distribution
(C) Formally prosecuting apprehended timber smugglers in district magistrate courts
(D) Conducting large-scale salvage logging and extraction of fire-damaged trees

94. The Kaimur Wildlife Sanctuary, prone to severe summer forest fires, is located in which district(s) of Uttar Pradesh?
(A) Lakhimpur Kheri and Bahraich
(B) Agra and Etawah
(C) Mirzapur and Sonbhadra
(D) Bijnor and Pauri

95. What is a "Crown Fire"?
(A) A controlled fire deliberately set by forest staff to burn dry undergrowth safely
(B) A minor localized fire restricted exclusively to the lower base of tree trunks
(C) A slow-moving, smoldering subterranean fire occurring within deep peat soils
(D) A fire ascending from ground to tree canopy, spreading rapidly through treetops

96. What is the fundamental principle behind "Joint Forest Management" (JFM) regarding disaster prevention?
(A) Deploying armed security forces to completely restrict local community access to protected forest boundaries
(B) Transferring full ownership of state forest lands to private commercial corporations to ensure maximum security
(C) Giving local communities a stake in forest resources incentivizes them to protect forests from fires
(D) Adopting a passive management strategy of ignoring minor surface fires to allow natural ecological processes

97. During a flood disaster in the Kaziranga National Park or similar riverine ecosystems like Dudhwa, why do animals migrate towards highways or elevated fringes?
(A) To opportunistically hunt domestic livestock present in surrounding fringe agricultural villages
(B) Highways offer dry highlands during floods, though animals face vehicle collisions and poaching
(C) Because wild animals are naturally attracted to bright headlights of night traffic on expressways
(D) Because rising monsoon floodwaters contain high concentrations of toxic industrial chemical waste

98. In reafforestation efforts after a disaster, what is the primary advantage of using "polybag raised seedlings" over direct seed sowing?
(A) Synthetic polybags naturally decompose within two days of soil contact, releasing active organic soil nutrients
(B) Polybag nursery seedlings require no artificial watering or irrigation after field planting in dry landscapes
(C) Synthetic polybags provide systemic chemical immunity that prevents all future pest attacks on mature trees
(D) Seedlings possess established roots, ensuring higher survival against weeds and harsh weather conditions

99. Which of the following is an example of a physiological adaptation that makes some native trees resilient to periodic surface fires?
(A) Developing thick, corky bark that insulates cambium layers from intense surface heat
(B) Maintaining thin, highly flammable outer bark layers that ignite rapidly upon heat exposure
(C) Exuding highly volatile, flammable aromatic resins onto leaf surfaces during summer months
(D) Developing shallow, superficial root networks spread across the uppermost topsoil surface

100. Consider the following statements about mapping forest disaster risks:
I. Vulnerability mapping involves identifying elements at risk, such as wildlife habitats and human settlements.
II. Hazard mapping focuses only on the geological age of the rocks beneath the forest.
III. Risk is calculated as a function of hazard,

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vulnerability, and the capacity to cope.
Which of the above statements is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

101. The invasive weed Parthenium hysterophorus (Congress grass) not only degrades forest floors but also causes which common problem in humans living in forest fringes?
(A) Severe respiratory issues and contact dermatitis
(B) Vector-borne malaria infections
(C) Acute water-borne cholera outbreaks
(D) Airborne pulmonary tuberculosis infections

102. What is the main objective of the National Forest Policy (1988) concerning forest fires?
(A) To use controlled fire as the main tool for clearing land for farming
(B) To let natural fires burn freely across forests to encourage fresh grass
(C) To prohibit all fire usage including domestic village cooking activities
(D) To protect forests from fires using modern technology and local participation

103. In forest administration, who typically commands the field-level firefighting squad comprising forest guards and fire watchers?
(A) The Principal Chief Conservator of Forests (PCCF)
(B) The Range Forest Officer (RFO) or local Forester
(C) The District Magistrate of the respective district
(D) The Chief Minister acting as disaster authority

104. How do recurrent forest fires negatively impact soil fertility in the long run?
(A) By constantly depositing excessive synthetic nitrogen compounds into deep topsoil layers
(B) By physically transforming organic topsoil into impermeable granite bedrock formations
(C) By destroying soil microbes, volatilizing key nutrients like nitrogen, and removing organic humus
(D) By permanently increasing sub-surface soil moisture content and water retention capacity

105. Read the following Assertion and Reason carefully and select the correct option.
Assertion (A): Drones (UAVs) equipped with thermal cameras are highly effective for post-fire mop-up operations.
Reason (R): They can detect smoldering underground roots and hidden hotspots that are invisible to the naked eye, preventing reignition.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

106. A key strategy for drought management in the social forestry sector is the selection of appropriate species. Which of the following tree species is highly drought-resistant and suitable for arid/semi-arid regions of UP (like Bundelkhand)?
(A) Babul (Acacia nilotica)
(B) Teak (Tectona grandis)
(C) Sal (Shorea robusta)
(D) Mahogany (Swietenia macrophylla)

107. When a forest dwelling community loses minor forest produce due to a massive forest fire, which legal framework can theoretically facilitate their rights and eventual rehabilitation/compensation?
(A) The Indian Contract Act, 1872 legal framework
(B) The Forest Rights Act, 2006 and disaster relief funds
(C) The Companies Act, 2013 corporate governance rules
(D) The Motor Vehicles Act, 1988 statutory traffic codes

108. According to recent FSI reports, the 'highly fire-prone' forest areas in India are largely characterized by which type of vegetation?
(A) Tropical evergreen forests
(B) Dry deciduous forests
(C) Alpine scrub
(D) Mangrove forests

109. Which global treaty focuses on reducing greenhouse gas emissions, a critical step in addressing the climate-change-driven increase in global forest disasters?
(A) The Paris Agreement (UNFCCC)
(B) The Ramsar Convention on Wetlands
(C) The CITES Convention on Trade
(D) The Basel Transboundary Convention

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110. Consider the following statements about illegal felling and its control:
I. Smuggling of timber often utilizes local rivers for easy transport of logs.
II. The establishment of permanent forest check-posts is a measure to curb illegal transit of forest produce.
III. Confiscation of vehicles involved in timber smuggling is permitted under the Indian Forest Act, 1927.
IV. Only non-commercial tree species are targeted by timber smugglers.
Which of the above combination of statements is correct?
(A) II, III, and IV only
(B) I, III, and IV only
(C) I, II, and III only
(D) I, II, and IV only

111. Which organization prepares the "State of Forest Report" (ISFR) biennially, which includes an assessment of fire-prone forest areas in India?
(A) Wildlife Institute of India (WII)
(B) Indian Council of Forestry Research and Education (ICFRE)
(C) National Biodiversity Authority (NBA)
(D) Forest Survey of India (FSI)

112. The creation of a "buffer zone" around a national park serves which primary disaster management purpose?
(A) To provide designated tracts of clear land for unchecked commercial industrial development
(B) To serve as an exclusive, restricted hunting reserve for high-ranking local administrative officials
(C) To act as a shock absorber mitigating human-wildlife conflict and absorbing pressures before core areas
(D) To establish secure regional storage facilities for hazardous toxic waste away from urban centers

113. A 'Crown Fire' is most likely to occur in which of the following conditions?
(A) Sparse vegetation zones dominated exclusively by short annual grasses
(B) Dense coniferous forests with heavy ladder fuels and strong winds
(C) Swampy mangrove forest habitats experiencing periodic high tide floods
(D) Recently logged forest tracts that have been completely clear-felled

114. The term 'Ladder Fuel' in forest fire terminology refers to:
(A) Flammable liquid fuels like diesel or gasoline stored at remote field camps for operational vehicles
(B) Temporary wooden ladders left behind by local fruit and non-timber forest produce gatherers in trees
(C) Highly combustible biogenic gases naturally emitted from waterlogged swampy forest soils and wetlands
(D) Vegetation like shrubs and low branches allowing surface fires to climb into forest canopies

115. Match List I with List II and select the correct option.
List I:
P. FSI FAST
Q. Ground Check
R. Fire Beater
S. Controlled burning
List II:
1. A physical tool used by ground staff to smother surface flames
2. A satellite-based near-real-time SMS alert system
3. A pre-season preventive measure to reduce fuel load
4. Physical verification of a satellite alert by beat staff
(A) P-2, Q-4, R-1, S-3
(B) P-4, Q-2, R-3, S-1
(C) P-2, Q-1, R-4, S-3
(D) P-3, Q-4, R-1, S-2

116. In the context of disaster management, what is a "mock drill" in a forest department?
(A) A destructive forestry practice of systematically drilling deep holes in tree trunks to extract commercial resin
(B) A traditional ritualistic dance performed by indigenous fringe communities to appease local forest deities
(C) A practice simulation of emergencies like fires to test response readiness of staff and equipment
(D) An agricultural method of sowing commercial tree seeds across degraded forest floors using mechanical drills

117. What is the fundamental difference between the roles of the NDMA and the SDRF?
(A) NDMA sets national policy guidelines, while

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(B) Magnetic Resonance Imaging (MRI) scans
(C) Carbon Dating isotope analysis methods
(D) High-resolution Electron Microscopy

150. An invasive species introduced historically for timber or ornamentation often becomes a disaster later. Which tree species, widely planted earlier for quick greening in dry areas, is now considered ecologically detrimental in parts of North India due to its aggressive spread and water-depleting nature?
(A) Neem tree (Azadirachta indica)
(B) Peepal tree (Ficus religiosa)
(C) Mango tree (Mangifera indica)
(D) Vilayati Babul (Prosopis juliflora)

151. Which national legislation governs the diversion of forest land for non-forest purposes (like large dams), thereby attempting to regulate man-made ecological changes and potential disasters?
(A) The Environment (Protection) Act, 1986
(B) The Forest (Conservation) Act, 1980
(C) The Biological Diversity Act, 2002
(D) The Water (Prevention and Control of Pollution) Act, 1974

152. In forest fire management, the term "Mop-up" refers to:
(A) Deliberately initiating controlled prescribed fires along pre-cleared forest perimeters
(B) Utilizing specialized aerial helicopters to survey and map post-fire burnt area boundaries
(C) Extinguishing burning material near control lines after main fire passage to secure edges
(D) Executing mandatory emergency evacuations of all human populations from nearby fringe villages

153. What is the most immediate health impact of massive forest fires on human populations residing in nearby cities or fringes?
(A) Widespread outbreaks of infectious water-borne diseases such as acute cholera
(B) Long-term increased statistical incidence of malignant skin cancer among residents
(C) Acute systemic Vitamin D deficiency caused by temporary blockage of sunlight overhead
(D) Exacerbation of respiratory illnesses due to severe smoke and particulate pollution

154. Modern disaster management incorporates 'Incident Response Systems' (IRS). In the event of a catastrophic forest fire spanning multiple divisions, who typically assumes the role of Incident Commander at the district level?
(A) The District Magistrate or designated senior forest official
(B) The local Beat Guard in charge of the affected forest beat
(C) The elected local Sarpanch of the adjacent village Panchayat
(D) The Chief of the State Police department executive division

155. Why is the conservation of natural wetlands inside forests crucial for drought management?
(A) They provide optimal designated dumping locations for disposing of organic forest biomass waste
(B) Natural sponges storing monsoon water, slowly releasing it to sustain groundwater and wildlife
(C) They significantly accelerate surface water evaporation rates during extreme summer heatwaves
(D) They completely prevent the natural growth of all terrestrial vegetation across surrounding areas

156. In 2023-2024, if a severe forest fire breaks out in the Shivalik forest circle of UP, which state's borders might face immediate ecological/wildlife spillover impacts?
(A) Madhya Pradesh
(B) Uttarakhand
(C) Bihar
(D) Rajasthan

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157. Which international organization coordinates the "Global Forest Watch", an open-source web application to monitor global forests in near real-time, including fire alerts?
(A) World Resources Institute (WRI)
(B) Amnesty International Council
(C) Greenpeace International Group
(D) International Red Cross Society

158. The illegal practice of 'girdling' trees in a forest is done primarily to:
(A) Permanently mark mature canopy trees for legal state conservation
(B) Naturally stimulate and increase seasonal commercial fruit yields of trees
(C) Sever phloem to dry out trees for illegal harvesting as dead wood
(D) Apply protective biological treatments shielding bark from beetle attacks

forest catchments

125. The "Forest Fire Danger Rating System" (FFDRS) is primarily an example of:
(A) Early warning and preparedness
(B) Active disaster response operations
(C) Post-event disaster recovery efforts
(D) Post-disaster compensation relief

126. Eradication of invasive weed species from a forest requires sustained effort because:
(A) Invasive weed species are strictly protected under statutory provisions of the Wildlife Protection Act
(B) They are continuously and intentionally replanted by state forest departments for soil stabilization
(C) They possess massive soil seed banks and rapid vegetative regeneration capabilities
(D) Native wild herbivores refuse to consume any other natural forage, causing weed protection

127. Which national policy document first recognized the need for a dedicated strategy to combat forest fires in India, leading to the creation of the NAPFF?
(A) The National Green Tribunal Act, 2010 statutory provisions
(B) The Indian Penal Code, 1860 forest offense sections
(C) The Wildlife Protection Act, 1972 habitat directives
(D) The National Action Plan on Climate Change (NAPCC)

128. What is the primary function of a 'Fire Watch Tower' in a forest division?
(A) To serve as elevated recreational viewing decks for ecotourism visitors during peak summer safari seasons
(B) To act as primary high-altitude lightning conductors preventing direct strikes on tall mature forest trees
(C) To spot smoke plumes across tree canopies and triangulate locations of early fires
(D) To function as elevated water storage tanks supplying gravity-fed irrigation to nearby forest nurseries

129. How does an intense forest fire affect the local hydrology of a watershed?
(A) It significantly increases the sub-surface water retention and absorption capacity of watershed soils
(B) Removing plant cover and litter increases runoff, causing flash floods and soil erosion
(C) It causes deep subterranean groundwater tables to rise rapidly to the surface across the watershed
(D) It naturally purifies flowing stream water by completely filtering out all suspended toxic minerals

130. Consider the following statements about the use of drones (UAVs) in forest management:
I. They can be used to survey encroached forest areas without sending ground teams into potentially hostile situations.
II. They are entirely useless in mountainous terrain due to signal loss.
III. Equipped with NDVI (Normalized Difference Vegetation Index) sensors, they can assess the health of the forest canopy and detect pest damage early.
Which of the above combination of statements is correct?
(A) I and II only
(B) II and III only
(C) I, II, and III
(D) I and III only

131. In the context of drought management, which soil moisture conservation structure is typically constructed along the slopes in forest areas?
(A) Continuous Contour Trenches (CCT)
(B) Heavy concrete sea wall structures
(C) Deep sub-surface tube well systems
(D) Elevated overhead canal aqueducts

132. The Pradhan Mantri Fasal Bima Yojana (PMFBY) covers crop losses. If a forest fire spreads to adjoining agricultural lands, can the affected farmers claim insurance?
(A) No, fires originating from forest areas are strictly excluded under all crop insurance policies
(B) No, only state forest departments possess legal standing to claim compensation for crop damages
(C) Yes, if the crop is insured and localized calamities are covered under scheme rules
(D) Yes, but only if affected farmers formally surrender land titles to state forest authorities

133. According to ISFR 2021 data, what percentage of India's forest cover is estimated to be prone

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(C) The relative humidity of the atmosphere during rainstorms
(D) The concentration of sap contained within living root systems

84. Which silvicultural system relies heavily on preserving the 'mother trees' to ensure natural regeneration after a planned timber harvest, mitigating the disaster of deforestation?
(A) Clear felling system
(B) Coppice system
(C) Shelterwood system
(D) Taungya system

85. Match List I with List II and select the correct option.
List I:
P. Recurrent flooding
Q. Severe summer fires and drought
R. Encroachment by agricultural expansion
S. Weed choking of wetlands
List II:
1. Vindhyan Ranges (Mirzapur/Sonbhadra)
2. Dudhwa and Terai Arc
3. Nawabganj and Sandi Bird Sanctuaries
4. Forest fringes of the Gangetic plain
(A) P-2, Q-1, R-4, S-3
(B) P-1, Q-2, R-3, S-4
(C) P-2, Q-3, R-1, S-4
(D) P-4, Q-1, R-2, S-3

86. Which type of forest pest is characterized by insects laying eggs inside the bark, with larvae tunneling through the cambium layer, eventually girdling and killing the tree?
(A) Leaf-chewing defoliators
(B) Phloem-feeding sap-suckers
(C) Epidermal canopy leaf miners
(D) Bark beetles and wood borers

87. A major ecological impact of floods in forest ecosystems is the deposition of heavy silt. What is a direct negative effect of excessive siltation?
(A) It immediately increases the structural height of mature canopy trees across the river basin
(B) It smothers undergrowth, buries seeds too deep to germinate, and alters stream courses
(C) It permanently cleanses the entire forest floor soil profile of harmful fungal pathogens
(D) It rapidly transforms a dry deciduous forest ecosystem into a tropical evergreen forest

88. How does 'phenological shift' driven by climate change exacerbate forest pest disasters?
(A) It causes trees to drop leaves permanently, preventing pest attachment to branches
(B) It converts pest species into specialized herbivores that consume only invasive weeds
(C) Mild winters fail to kill overwintering pests, causing early spring outbreaks
(D) It forces terrestrial forest pests to migrate permanently to open oceanic waters

89. Which of the following is NOT a consequence of unchecked illegal encroachment in protected forest areas?
(A) Creation of 'edge effects' that degrade the microclimate of the core forest
(B) Introduction of domestic animal diseases to wild ungulates
(C) Disturbance of natural wildlife corridors
(D) Expansion of the natural territorial range of apex predators like tigers

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90. Select the correct logical sequence of ecological succession after a severe, stand-replacing forest fire:
(A) Mature climax forest → Shrubs → Pioneer species (grasses/weeds) → Bare soil
(B) Bare soil → Pioneer species (grasses/weeds) → Shrubs and young trees → Mature climax forest
(C) Pioneer species → Bare soil → Mature climax forest → Shrubs
(D) Mature climax forest → Bare soil → Pioneer species → Shrubs

91. The SNPP (Suomi National Polar-orbiting Partnership) satellite provides data for the VIIRS sensor. VIIRS stands for:
(A) Variable Intensity Infrared Radiation System
(B) Visual and Infrared Imaging Radiometer Suite
(C) Video Imaging and Intensity Resolution Sensor
(D) Visible Infrared Inspection and Ranging Satellite

92. A comprehensive Forest Disaster Management Plan must be updated periodically. What is the generally accepted best practice for this review frequency?
(A) Once every fifty years as part of regular long-term statutory reviews
(B) Annually, prior to the onset of vulnerable fire or monsoon seasons

typically includes which disaster management component?
(A) Community mobilization protocols for early fire suppression and identifying escape routes
(B) Comprehensive economic plans to export local harvested hardwood timber to global markets
(C) Strategic frameworks for establishing large-scale commercial heavy industries in villages
(D) Regulatory policies for setting up private commercial toll booths on state forest roads

142. The Disaster Management Act of 2005 mandates the creation of which fund at the national level, which can be utilized for severe, catastrophic natural disasters affecting large landscapes?
(A) National Biodiversity Authority Conservation Fund
(B) Compensatory Afforestation Fund Management Authority
(C) Statutory National Disaster Response Fund (NDRF)
(D) Emergency Prime Minister's Citizen Assistance Fund

143. Which of the following tree species found in the Vindhyan region is highly valued by local communities but often becomes a source of ground fires due to the practice of clearing the forest floor to collect its falling flowers/fruits?
(A) Deodar (Cedrus deodara)
(B) Rhododendron (Rhododendron arboreum)
(C) Sundari (Heritiera fomes)
(D) Mahua (Madhuca longifolia)

144. To effectively manage a fire line, it is essential that it is maintained "clean". What does "clean" mean in this context?
(A) Thoroughly washed with industrial soap and pressurized water solutions
(B) Fully planted with dense rows of non-native thick green turf grass species
(C) Cleared of all dry leaves, twigs, and combustible fuels down to mineral soil
(D) Evenly covered with a thick insulating layer of dry fallen pine needle debris

145. Match List I with List II and select the correct option.
List I:
P. Hastinapur Wildlife Sanctuary
Q. Ranipur Tiger Reserve
R. Sohagibarwa Wildlife Sanctuary
S. Dudhwa National Park

List II:
1. Flood inundation from Gandak river
2. Summer drought and dry deciduous forest fires
3. Extreme monsoonal flooding and siltation
4. Habitat fragmentation and river pollution (Ganga basin)

(A) P-4, Q-2, R-1, S-3
(B) P-1, Q-3, R-2, S-4
(C) P-4, Q-1, R-3, S-2
(D) P-2, Q-4, R-1, S-3

146. A critical indirect impact of forest fires on aquatic ecosystems (like forest streams) is:
(A) Rapid and uncharacteristic increase in wild freshwater fish populations across streams
(B) Substantial reduction in ambient surface water temperatures during summer heatwaves
(C) Permanent transformation of freshwater forest streams into hyper-saline saltwater channels
(D) Ash and sediment run-off causing decreased dissolved oxygen and fish mortality

147. Which of the following reafforestation strategies is ecologically unsound for a heavily degraded, fire-burnt slope?
(A) Planting monocultures of flammable exotic species like Eucalyptus
(B) Planting deep-rooted native soil-binding grasses along degraded slope contours
(C) Executing staggered contour trenching alongside multi-species native tree planting
(D) Allowing natural ecological succession to proceed where viable rootstock survives

148. The concept of 'Carbon Sequestration' in forests is most negatively impacted by which of the following?
(A) Controlled silvicultural thinning operations in dense compartments
(B) Systematically planting native broad-leaved hardwood tree species
(C) Severe crown fires converting living biomass into atmospheric carbon
(D) Statutory establishment and legal declaration of new National Parks

149. Which of the following spatial mapping technologies involves layering topographical, vegetation, and climatic data to predict future forest disaster zones?
(A) Geographic Information Systems (GIS)

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to forest fires (ranging from extremely to moderately prone)?
(A) Approximately 35%
(B) Less than 5%
(C) Approximately 10%
(D) Over 90%

134. Which international agency collaborates with India under the "USAID Forest PLUS" program to enhance forest management and technical capacity, including aspects of disaster resilience?
(A) United Nations Environment Programme (UNEP) global council
(B) World Wildlife Fund for Nature (WWF-International) network
(C) Food and Agriculture Organization (FAO) of the United Nations
(D) United States Agency for International Development (USAID)

135. Read the following Assertion and Reason carefully and select the correct option.
Assertion (A): Controlled back-burning is a highly risky firefighting tactic that must be executed by experienced personnel.
Reason (R): If the wind direction suddenly changes, a back-burn can escape control and accelerate the spread of the main fire.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

136. Which of the following is an effective structural measure to prevent landslides in highly degraded forested hills?
(A) Complete deforestation and clear-felling of all remaining vegetation along unstable slopes
(B) Spraying liquid synthetic chemical fertilizers directly onto bare rock faces to halt erosion
(C) Construction of retaining walls, gabions, and planting deep-rooted Vetiver grass
(D) Building multi-story concrete hotel complexes and asphalt roads across vulnerable slopes

137. Which state government agency in Uttar Pradesh works closely with the Forest Department to provide satellite data inputs (like from remote sensing) for mapping forest disaster risks?
(A) Uttar Pradesh Police Department traffic wing
(B) UP State Road Transport Corporation authority
(C) UP Jal Nigam water resources management board
(D) Remote Sensing Applications Centre (RSAC-UP)

138. Identify the incorrect statement regarding the ecological role of natural, low-intensity surface fires in certain forest ecosystems (e.g., Pine forests).
(A) They completely destroy the root systems of all mature trees.
(B) They help in returning nutrients locked in dry litter back to the soil.
(C) They assist in the natural regeneration of species whose seeds require heat to crack open.
(D) They reduce the hazardous accumulation of combustible fuel on the forest floor.

139. Illegal mining of sand and boulders from riverbeds flowing through forest areas (like in the Terai region) directly exacerbates which natural disaster?
(A) Widespread forest fires triggered by elevated ground temperatures
(B) Floods, by altering river morphology and accelerating bank erosion
(C) Geological volcanic eruptions along fault lines in river basins
(D) Severe biological pest infestations across surrounding tree canopies

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140. Consider the following statements about early warning systems:
I. They rely purely on historical data and do not use real-time weather inputs.
II. The FSI uses MODIS and VIIRS satellite data for fire detection.
III. The warning is disseminated to state nodal officers and beat guards.
IV. Cloud cover can temporarily hinder satellite-based thermal detection of fires.
Which of the above statements represent the correct combination?
(A) I, II, and III only
(B) II, III, and IV only
(C) I, III, and IV only
(D) I, II, and IV only

141. The preparation of a 'Micro-plan' at the village level under Joint Forest Management (JFM)

159. Find the odd one out regarding the ecological benefits of intact forest cover in disaster mitigation:
(A) Significant reduction of flood peak discharge during monsoons
(B) Structural binding of slope soil to prevent devastating landslides
(C) Active regulation and stabilization of local forest micro-climates
(D) Facilitating the rapid spread of invasive desert locust swarms

160. What is the fundamental mechanism by which a 'Fire Beater' (a traditional tool made of leafy green branches or a rubber flap) extinguishes a small surface fire?
(A) By spraying specialized liquid chemical retardants directly onto active surface flames
(B) By rapidly absorbing all ambient thermal heat through an endothermic chemical reaction
(C) By physically smothering the flames, thereby cutting off atmospheric oxygen supply
(D) By instantly freezing combustible forest fuels through cryogenic chemical reactions

161. In the context of the Forest Survey of India's monitoring, what does a "Thermal Anomaly" detected by a satellite signify?
(A) A localized geographic region experiencing intense sub-zero atmospheric cold and frost
(B) An area with temperatures significantly above surroundings, indicating fire
(C) Thermal heat signatures produced by large herds of migrating megaherbivores like elephants
(D) An atmospheric weather front characterized by extremely heavy localized monsoonal rainfall

162. How does the fragmentation of forest tracts (due to roads/canals) exacerbate the disaster of pest infestations?
(A) It creates smooth paved infrastructure allowing terrestrial pests to travel long distances easily
(B) It substantially increases surface wind velocities, blowing pest populations away from forests
(C) It forces flying pest species into open irrigation canals where they drown in large numbers
(D) It prevents natural predators from moving across landscapes to control pest populations

163. The primary responsibility for the prevention and management of forest fires in a state lies directly with:
(A) The respective State Forest Department
(B) The Ministry of Environment, Forest and Climate Change (MoEFCC) only
(C) The Indian Army
(D) The local municipal corporation

164. What is the main characteristic of a 'Subterranean fire' (or peat fire)?
(A) It advances rapidly across open grass plains, covering many miles within a single day
(B) It occurs exclusively within upper foliage canopies of tall mature evergreen tree species
(C) It burns deep underground in organic soil, smoldering for months and defying suppression
(D) It produces towering visible flames rising hundreds of feet high into the upper atmosphere

165. When a state requests central assistance during an uncontrollable forest fire, which specialized force is deployed by the Government of India under NDMA protocols?
(A) National Security Guard counter-terror unit
(B) National Disaster Response Force (NDRF)
(C) Central Bureau of Investigation agency
(D) Railway Protection Force division

NODIA

166. A critical part of pre-fire season preparation by forest staff is the 'clearing of fire lines'. When is this operation strictly supposed to be completed in Uttar Pradesh?
(A) Immediately before the onset of the wet monsoon season in June
(B) During the coldest period of peak winter in late December
(C) Exclusively after an active surface fire has started in April
(D) Before the onset of the dry summer season by February/March

167. Which of the following is considered the best long-term ecological solution to control the spread of highly flammable invasive weeds like Lantana camara?
(A) Continuous aerial spraying of synthetic chemical weedicides across affected forest compartments
(B) Uprooting weeds and planting canopy-forming native trees to shade them out
(C) Systematically setting the affected forest

floor on fire every month to burn emerging seedlings

(D) Covering damaged forest topsoil completely with thick industrial concrete paving slabs

168. How does the implementation of the Forest Rights Act (FRA), 2006, ideally contribute to forest disaster management?

(A) It grants local communities absolute rights to clear-fell reserved forests for commercial industrial complexes

(B) It legally relieves local indigenous communities of all responsibilities regarding forest conservation or protection

(C) Granting tenure security creates ownership, motivating communities to protect forests from fires

(D) It mandates the forced eviction of all local human settlements, leaving forest tracts completely uninhabited

169. What is the primary purpose of constructing 'Check Dams' in degraded forest areas?

(A) To generate large-scale commercial hydroelectric power for regional urban electricity grids

(B) To construct heavy reinforced bridge pathways for transporting logging machinery across streams

(C) To trap and harvest valuable migratory fish species during seasonal breeding migrations upstream

(D) To reduce water velocity, arrest soil erosion, and recharge groundwater to combat drought

170. According to standard operating procedures (SOPs) for forest fires, what is the first immediate action a beat guard must take upon verifying a fire alert?

(A) Assess the situation, suppress small surface fires, and inform higher officials for backup

(B) Draft and submit a formal written report directly to central Ministry headquarters in Delhi

(C) Wait for specialized SDRF response teams to arrive from state capitals before taking action

(D) Issue emergency public evacuation orders for the entire district administration immediately

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ANSWERS

1. (B) Lightning strikes
Lightning strikes represent the primary natural cause of forest fires on a global scale. When lightning hits dry vegetation or combustible organic matter, high voltage discharges generate intense heat that can instantly ignite fires. In India, human activities account for the vast majority of forest fires, while natural lightning strikes cause only a small fraction of overall incidents.

2. (D) Aerial dropping of chemical fire retardants as a preventive measure
Standard pre-fire management in Indian forests focuses on physical fuel reduction, controlled burning of leaf litter, and maintaining cleared fire lines along roads and administrative boundaries. Aerial dropping of chemical fire retardants is an emergency suppression tactic used during active, high-intensity blazes rather than a routine preventive measure practiced prior to fire outbreak.

3. (A) Pest and disease infestation
Insect pests and pathogenic organisms cause severe tree dieback by feeding on foliage, boring through vascular tissues, or interrupting sap circulation. Progressive defoliation reduces photosynthetic capacity, while disrupted nutrient transport weakens structural integrity over time. Unlike immediate physical destruction from surface fires or floods, pest infestations lead to continuous deterioration and gradual mortality.

4. (C) Both statements are correct and Statement II explains Statement I.
Extended dry spells impose severe physiological water stress on trees, significantly reducing their internal hydraulic pressure and resin production. Because trees rely on sap pressure to physically flush out boring insects, diminished resin flow leaves them vulnerable. Consequently, bark beetle populations easily penetrate weakened bark tissues, leading to widespread insect infestations during prolonged drought periods.

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5. (A) Complete removal of topsoil and the native seed bank
Severe landslides on forested slopes physically strip away the fertile topsoil layer along with the buried seed bank, roots, and organic matter. This sudden mass wasting exposes bare, unweathered bedrock or compact subsoil, preventing immediate natural regeneration. The loss of organic substrate forces primary ecological succession to restart from a highly degraded state.

6. (D) By increasing dry spell durations and raising average temperatures
Climate change significantly alters weather patterns by extending summer dry periods and elevating ambient surface temperatures across forest landscapes. High temperatures accelerate evapotranspiration, rapidly drying out living foliage, fallen leaves, and woody debris. This persistent lack of moisture increases fuel flammability, creating prime environmental conditions for frequent and intense forest fires.

7. (B) Fragmentation of wildlife habitats and human-wildlife conflict
Unauthorized tree felling and illegal land conversion disrupt contiguous forest cover, breaking natural habitats into isolated patches. Habitat fragmentation isolates wildlife populations, reduces available foraging territory, and forces wild animals to cross into fringe human settlements. This movement significantly elevates instances of human-wildlife conflict, crop damage, and retaliatory encounters along forest boundaries.

8. (C) Seismograph
Forest fire monitoring and early detection rely on satellite sensors and automated alerting systems. Optical and thermal sensors like MODIS and VIIRS detect thermal anomalies on the earth surface, while forest alerts notify ground staff of active hotspots. In contrast, a seismograph measures subterranean seismic waves caused by earthquakes and provides no fire data.

64. (C) Forest Fire Danger Rating systems utilizing canopy density, vegetation types, and weather data
Early pre-warning systems for forest fires rely on integrated Fire Danger Rating indices. These models process remote sensing data on forest canopy density and vegetation moisture along with meteorological inputs like surface temperature, relative humidity, and wind speed. Analyzing these factors enables forecasting of potential fire ignition risks prior to actual fire outbreaks.

65. (B) To provide specialized rescue and emergency support during catastrophic forest fires or severe floods
The State Disaster Response Force is a specialized emergency unit deployed during severe natural or man-made disasters. In forest management, the force provides technical rescue operations, emergency evacuations, and specialized assistance during major catastrophic fires or severe seasonal floods that exceed the direct operational capacity of local forest departmental staff.

66. (D) It lies in the Terai arc landscape, intersected by Himalayan rivers like the Sharda
Pilibhit Tiger Reserve is situated within the low-lying Terai arc landscape along the foothills of the Himalayas. The region is traversed by major snow-fed and rain-fed rivers like the Sharda. Heavy monsoon precipitation in upstream catchment areas causes these rivers to overflow, inundating surrounding grassland and forest habitats.

67. (A) In winter or early spring before the dry season, during cool morning or evening hours
Controlled burning is conducted during late winter or early spring when ambient temperatures are low and relative atmospheric humidity remains high. Executing burns during cool morning or evening hours prevents fires from escalating out of control. This management practice safely consumes dry ground litter, reducing fuel loads before summer.

68. (C) Involve local fringe village communities in protecting degraded forests on a benefit-sharing basis
Joint Forest Management was established to build institutional partnerships between state forest departments and local fringe village communities. The framework grants local villagers usufruct rights over non-timber forest produce and a share in timber harvest profits. In return, communities actively assist in forest conservation, illegal felling prevention, and fire control.

69. (A) Schedule I
Schedule I of the Wildlife Protection Act lists endangered fauna receiving the highest level of statutory legal protection in India. Strict penal provisions apply to offenses involving these species. Protecting their critical habitats from environmental disasters, fire damage, and illegal human encroachment is legally mandated to ensure their long-term survival.

70. (D) I and II only
Restoring damaged forest landscapes prioritizes natural regeneration when surviving rootstocks and soil seed banks remain viable. In severely degraded areas where soil sterilization has occurred, artificial planting of native species becomes necessary. Introducing fast-growing exotic invasive plants disrupts native ecosystem dynamics and increases long-term ecological vulnerability.

71. (B) It converts forests from carbon sinks into carbon sources through massive emissions and biomass loss
Intact forests act as carbon sinks by continuously absorbing atmospheric carbon dioxide through photosynthesis. Frequent, severe forest disasters destroy living tree biomass and accelerate vegetation decay. Uncontrolled biomass combustion releases stored carbon into the atmosphere, transforming resilient forest ecosystems into net sources of greenhouse gas emissions that worsen global warming.

72. (C) Fire vulnerability and hazard zonation map
A fire vulnerability and hazard zonation map serves as the core operational document for disaster planning within a forest division. Overlaying spatial data on historical fire points, fuel loads, vegetation types, and accessibility allows forest officers to identify high-risk beats, construct strategic fire lines, and allocate suppression resources effectively.

73. (D) Water Hyacinth (Eichhornia crassipes)
Water Hyacinth is an aggressive invasive aquatic weed that rapidly colonizes freshwater lakes,

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18. (D) Temperature, relative humidity level, surface wind speed, and fuel moisture
Fire Danger Rating Systems quantify atmospheric and environmental variables that directly influence fire ignition and spread behavior. Key parameters include ambient temperature, relative atmospheric humidity, surface wind velocity, and fuel moisture content. Evaluating these factors enables forestry authorities to predict fire risk levels, issue timely warnings, and strategically pre-position firefighting crews.

19. (A) By serving as combustible ladder fuel facilitating crown fires
Dense thickets of invasive alien plants like Lantana camara create continuous structural vegetation layers connecting the forest floor to tree canopies. Acting as flammable ladder fuels, these resinous shrubs enable low-intensity surface fires to climb into mature tree crowns. This transition transforms minor ground fires into highly destructive, uncontrollable crown fires.

20. (C) I and III only
The National Action Plan on Forest Fires focuses on empowering local fringe communities and employing modern satellite technology for early detection and risk mapping. It advocates controlled burning under strict operational protocols rather than complete abolition. Furthermore, the framework encourages seamless interstate collaboration and resource sharing to handle large-scale transboundary forest fire emergencies effectively.

21. (A) To patrol vulnerable forest patches, maintain fire lines, and report early smoke
Fire watchers are temporary field workers deployed during the high-risk dry season to protect forest beats. Their primary duties include patrolling fire-prone areas, clearing litter from established fire lines, and monitoring watchtowers for smoke emissions. Upon detecting early fires, they immediately alert beat officers and initiate initial suppression efforts on the ground.

22. (D) Massive release of sequestered carbon dioxide and airborne black carbon
Large-scale combustion of forest biomass releases massive quantities of stored carbon back into the atmosphere in the form of carbon dioxide and carbon monoxide. Incomplete burning generates heavy concentrations of black carbon aerosols and fine particulate matter. These emissions severely degrade regional air quality and contribute directly to global climate warming dynamics.

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23. (B) To map fire-prone zones, analyze burn severity, and plan mitigation strategies
Geographic Information Systems enable the integration and spatial analysis of environmental datasets such as topography, vegetation types, weather conditions, and historical fire occurrences. Forestry officials use these spatial layers to identify high-risk fire zones, assess post-fire damage severity, design strategic fire lines, and deploy firefighting personnel and resources efficiently.

24. (C) Creating continuous contour trenches (CCT) and check dams for soil moisture conservation
Constructing continuous contour trenches and check dams across degraded forest catchments captures monsoonal surface runoff and reduces soil erosion. Retaining water on hillslopes increases subterranean percolation, recharges localized groundwater tables, and maintains soil moisture reserves. These structural measures help forest vegetation survive extended drought periods and mitigate severe water stress.

25. (D) P-3, Q-4, R-1, S-2
Disaster management follows four sequential phases to minimize risks and impact. Mitigation involves structural and policy measures to reduce hazard severity before events occur. Preparedness focuses on planning, early warning systems, and training prior to disasters. Response encompasses immediate firefighting and emergency efforts during events, while recovery centers on long-term ecological restoration.

26. (A) Kaimur Wildlife Sanctuary and surrounding Vindhyan ranges
The Vindhyan landscape encompassing Kaimur Wildlife Sanctuary witnesses frequent surface fires lit deliberately by local villagers during early spring. Ground litter is intentionally burned to clear fallen leaves beneath Mahua trees, facilitating easier collection of flowers and seeds. Uncontrolled ground fires frequently escape these collection sites, spreading rapidly into surrounding dry forests.

27. (B) The Sendai Framework for Disaster Risk Reduction
The Sendai Framework for Disaster Risk Reduction is a global treaty adopted under United Nations auspices to guide disaster management strategies. It emphasizes understanding disaster risk, strengthening governance, investing in resilience, and enhancing disaster preparedness. Indian forest disaster strategies incorporate its principles to build climate-resilient landscapes and mitigate natural hazards effectively.

28. (B) Crown fire
Crown fires burn through the high canopy layers of trees and shrubs, advancing rapidly ahead of surface fires under strong wind conditions. Because they generate extreme thermal heat and spread across treetops beyond direct ground reach, crown fires are exceptionally difficult to suppress, causing total canopy destruction and high mortality among mature trees.

29. (A) Promote a fresh flush of green grass for livestock grazing
Setting intentional fires on the forest floor is a common agricultural practice among rural communities living near forest fringes. Burning dry surface litter and unpalatable woody vegetation exposes bare soil and stimulates the growth of tender green shoots after early rains. These fresh shoots provide nutritious fodder for free-grazing domestic livestock.

30. (A) Satellite detects thermal anomaly → FSI processes data → Alert SMS sent to field staff → Ground verification and firefighting
Modern fire monitoring begins when spaceborne thermal sensors detect heat anomalies on the earth surface. Centralized algorithms process satellite data to filter false signals and generate precise coordinates. Automated SMS alerts are immediately transmitted to field staff, who conduct ground verification and initiate localized containment operations to extinguish active fire fronts.

31. (D) Teak defoliator (Hyblaea puera)
The insect Hyblaea puera, commonly known as the Teak defoliator, causes severe damage in Teak plantations and natural forests. During outbreak seasons, larvae feed voraciously on fresh green leaves, stripping complete canopies bare across vast areas. Repeated defoliation severely reduces photosynthetic capacity, retarding tree growth rates and causing massive economic losses.

32. (C) Recent forest fires destroying vegetation and causing soil hydrophobicity
High-intensity forest fires consume ground cover, leaf litter, and root systems that naturally absorb rainfall. Thermal heat alters physical soil structure, creating a water-repellent hydrophobic surface layer. When intense rainstorms hit burnt catchments, infiltration rates drop sharply, generating massive surface runoff that surges down channels, triggering destructive flash floods.

33. (B) Complex interactions of prolonged drought, heat, and pest attacks
Forest dieback involves widespread, progressive mortality across mature tree stands caused by compounding environmental stresses. Extended drought conditions and extreme thermal stress deplete internal hydraulic pressure, weakening tree physiological defenses. Secondary opportunistic pathogens and wood-boring insects then invade weakened trees, causing canopy thinning, leaf loss, and widespread forest decline.

34. (D) Sal and Teak timber
The fertile Terai forest belt contains dense stands of high-value timber species such as Sal and Teak. High commercial demand for hardwood timber drives organized illegal felling and timber smuggling networks in the region. Illegal logging creates canopy openings, degrades core wildlife habitats, and exposes protected forest reserves to further human encroachment.

35. (A) Terra and Aqua
The Moderate Resolution Imaging Spectroradiometer is a key remote sensing instrument operating aboard NASA Earth Observing System satellites, named Terra and Aqua. These polar-orbiting satellites capture daily global imagery across multiple spectral bands. Thermal channels detect active fires and biomass burning, providing essential data for nationwide forest fire monitoring systems.

36. (C) A slow, smoldering fire burning thick organic matter below the surface
A ground fire, also termed a subterranean fire, burns deep below the surface within tightly packed organic material, peat moss, decomposed humus, and decaying tree roots. These fires

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smolder slowly without open flames, generating continuous smoke. Ground fires are difficult to detect and extinguish, lingering underground for months despite surface suppression.

37. (A) UP State Disaster Management Authority (UPSDMA)
The Uttar Pradesh State Disaster Management Authority serves as the statutory state body responsible for disaster policy, planning, and inter-departmental coordination. During major forest fires, severe floods, or extreme natural hazards, the authority coordinates emergency operations between the forest department, revenue officials, state police, and specialized disaster response forces.

38. (D) Organized illegal timber felling and smuggling
Suhelwa Wildlife Sanctuary faces heavy anthropogenic pressures due to its location along international and inter-district boundaries. Organized timber smuggling syndicates exploit dense forest patches to illegally fell valuable hardwood trees. Unchecked logging causes canopy fragmentation, habitat degradation, increased soil erosion, and severe disruption to native wildlife corridors.

39. (B) Fire lines should be planted with highly resinous trees to absorb the heat.
Fire lines function by breaking fuel continuity to halt advancing fire fronts. Planting highly resinous tree species along fire lines would increase combustible fuel load and accelerate fire transmission across boundaries. Instead, effective fire lines are kept entirely clean of dry leaves, woody debris, and flammable vegetation down to bare soil.

40. (C) I and III only
Local forest communities possess valuable traditional knowledge regarding local microclimates, weather patterns, and historical fire behavior. Joint Forest Management frameworks engage villagers in protection duties in exchange for usufruct rights over forest produce. Statutory provisions under forest rights legislation also mandate that forest-dwelling communities assist in protecting forests from fires and ecological degradation.

NODIA

41. (D) Displacement of wildlife, increasing human-wildlife conflict at forest edges
Severe seasonal flooding inundates low-lying grasslands and forest floors within protected areas, forcing wild animals to abandon submerged habitats. Terrestrial mammals migrate toward higher ground, often crossing park boundaries onto elevated roads, embankments, and village farmland. This sudden wildlife movement leads to increased crop depredation, vehicular accidents, and human-wildlife conflicts.

42. (A) Salvage logging of dead timber followed by native species reafforestation
Following catastrophic pest infestations, standing dead timber poses severe fire risks and harbors lingering insect populations. Silvicultural restoration involves carefully removing dead trees through salvage logging while preserving uninfected growth. The cleared area is subsequently replanted with a diverse mixture of native tree species to restore ecological resilience and canopy cover.

43. (B) High structural and genetic diversity enabling recovery from extreme weather events
Climate resilience in forest ecosystems depends on high genetic diversity, varied age structures, and species-rich canopy layers. Ecological diversity enhances adaptive capacity, allowing forests to withstand pest outbreaks, droughts, and severe fire disturbances. Diverse species exhibit different tolerance levels, ensuring that healthy vegetation remains to facilitate rapid ecosystem recovery following disasters.

44. (B) Oceanic tectonic plate boundaries
Spatial fire risk mapping integrates factors influencing fire ignition, fuel accumulation, and spread dynamics. Essential spatial layers include vegetation classification, fuel load density, slope aspect, elevation, ambient weather parameters, and proximity to roads or human settlements. Oceanic tectonic plate boundaries are irrelevant for terrestrial forest fire hazard assessments conducted far inland.

45. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Prosopis juliflora aggressively colonizes semi-arid environments, outcompeting native vegetation. Its extensive taproot system absorbs deep sub-surface groundwater reserves, lowering localized water tables and drying surrounding

9. (D) SNPP-VIIRS and Aqua/Terra-MODIS sensors
The Forest Survey of India utilizes thermal infrared data collected by MODIS aboard the Aqua and Terra satellites along with VIIRS aboard the Suomi-NPP satellite. These spaceborne sensors continuously detect thermal anomalies across forest covers. Automated algorithms process these heat signatures in near real-time, allowing rapid dissemination of fire alerts to field personnel.

10. (A) I and III only
A comprehensive Forest Disaster Management Plan requires thorough risk assessment and clear protocols across pre-disaster, active response, and post-disaster operational phases. Ground forest staff play a frontline role in mitigation and emergency suppression rather than being excluded. Effective planning integrates forest department personnel alongside specialized disaster relief agencies to ensure coordinated response actions.

11. (B) To issue national guidelines and frameworks for forest fire management
The National Disaster Management Authority serves as the apex policy-making body for disaster management across the country. In the context of forest fires, its primary responsibility involves laying down national guidelines, strategic frameworks, and risk reduction policies. State forest departments and local administration execute these overarching policies through ground operations and localized firefighting activities.

12. (B) Vindhyan forest ranges in Sonbhadra and Mirzapur
The Vindhyan forest tracts located in Sonbhadra and Mirzapur consist predominantly of dry deciduous vegetation. During dry summer months, these forests shed massive quantities of leaf litter, creating heavy fuel loads on the forest floor. High ambient temperatures combined with dry surface winds make this region highly vulnerable to frequent anthropogenic fires.

13. (A) To clear a vegetation gap to halt or slow surface fire spread
A fire line is a strategically cleared strip of land where all vegetation and combustible organic matter are completely removed down to bare mineral soil. By creating a physical break in continuous ground fuel, fire lines stop or slow down advancing surface fires, providing a safe baseline for firefighters to conduct suppression operations.

14. (C) Forming Joint Forest Management Committees (JFMCs) with local training and incentives
Participatory forest management through Joint Forest Management Committees fosters strong partnerships between local communities and state forest authorities. Providing formal training, modern equipment, and direct incentives encourages fringe villagers to actively prevent fires, report smoke emissions early, and assist ground crews in fire suppression operations while building long-term environmental stewardship.

15. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Rapidly moving forest fires burn through ground vegetation and canopy layers at high speeds. Ground-nesting birds, fledglings, and slow-moving reptiles possess limited mobility, rendering them unable to outrun advancing flames or dense smoke plumes. Consequently, severe fire events cause immediate mortality among these vulnerable species, leading to sharp localized population declines.

16. (C) Implementing soil and moisture conservation alongside native species regeneration
Restoring forests after severe fire damage requires immediate soil stabilization to prevent erosion, nutrient leaching, and topsoil loss. Constructing physical soil conservation barriers and conserving natural soil moisture support the recovery of surviving rootstocks. Encouraging native plant species regeneration ensures long-term ecological balance and prevents flammable invasive weeds from colonizing the disturbed landscape.

17. (B) Enhancing species diversity and focusing on drought-resistant native taxa
Promoting species diversity and incorporating indigenous drought-resistant plants enhance the adaptive capacity of forest ecosystems against severe climate impacts. Monocultures remain highly vulnerable to pest outbreaks and catastrophic fires, whereas diverse forests maintain multi-layered canopies and varied root structures. This ecological complexity improves water retention, stabilizes topsoil, and accelerates post-disturbance natural recovery.

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leading to widespread long-term environmental degradation.

55. (B) P-2, Q-4, R-1, S-3
Forest fires are classified based on their burning location and spread dynamics. Ground fires smolder slowly beneath the surface in organic soil layers. Surface fires burn leaf litter and undergrowth on the forest floor. Crown fires advance through canopy treetops, while spot fires arise from windborne embers landing beyond the main perimeter.

56. (C) Maintaining structural canopy diversity and a mix of native tree species
Maintaining multi-layered forest canopies and diverse native tree species prevents catastrophic pest outbreaks. Species diversity creates natural physical barriers that hinder specialized insect pests from spreading rapidly. Furthermore, mixed forest ecosystems support diverse populations of insectivorous birds and predatory insects, establishing biological controls that keep potential pest populations at non-damaging levels.

57. (D) To prevent wildlife mortality and mitigate human-wildlife conflict during droughts
During severe dry seasons, natural streams and waterholes in forest interiors dry up, causing severe physiological water stress among wild animals. Forest departments fill artificial waterholes and solar-powered guzzlers to sustain wildlife populations. Providing reliable water sources within forest boundaries prevents wild animals from straying into human settlements in search of water.

58. (A) A biological disaster
Mass infestation by the Sal heartwood borer insect represents a biological disaster in forestry. Larvae bore deep into the trunks of Sal trees, destroying vascular tissues and structural wood. Severe outbreaks cause widespread tree mortality across expansive forest tracts, leading to major ecological disruption, loss of biodiversity, and substantial economic damage.

59. (B) Organic matter is destroyed, creating a hydrophobic layer that increases surface runoff
High-intensity surface fires consume organic leaf litter and topsoil humus, releasing vaporized organic compounds that condense onto underlying soil particles. This process forms a water-repellent, hydrophobic soil layer beneath the surface. Consequently, rainwater infiltration rates drop sharply, increasing surface runoff, accelerating soil erosion, and heightening downstream flooding risks.

60. (B) II, I, IV, III
Formulating a Forest Disaster Management Plan follows a systematic multi-step process. First, a planning committee is established with relevant stakeholders. Next, spatial risk assessments and vulnerability mapping identify hazardous zones. Standard Operating Procedures are then drafted to guide response actions. Finally, formal administrative approval is secured, followed by practical mock drills.

61. (A) The pattern, frequency, intensity, and seasonality of fires in a given ecosystem
A fire regime describes the characteristic role fire plays within a specific ecological system over extended timeframes. It encompasses parameters such as fire return intervals, seasonal timing, operational intensity, spatial extent, and typical fire types. Climate change alters historical fire regimes, increasing fire frequency and severity across vulnerable forest biomes.

62. (C) Vastness of terrain making continuous physical ground patrolling extremely difficult
Dense natural forests cover vast geographical areas characterized by undulating topography, dense undergrowth, and limited road infrastructure. These physical environmental factors make continuous ground patrolling exceptionally challenging for forest guards. Timber smuggling syndicates exploit these remote, unmonitored forest beats to execute unauthorized tree felling and covert transport operations.

63. (D) Through automated SMS and email alerts sent directly to registered mobile numbers
The Forest Survey of India operates an automated alert framework integrated with remote sensing satellites. Upon detecting thermal anomalies, automated processing systems determine geographical coordinates and match them against administrative forest boundaries. Instant SMS and email notifications are transmitted directly to registered mobile phones of beat guards, enabling rapid ground verification.

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soil. Furthermore, the tree releases allelopathic biochemical compounds into the topsoil, suppressing seed germination and growth of indigenous flora and disrupting ecological balance.

46. (C) The District Magistrate (as Chairperson of the DDMA)
Under the statutory provisions of the Disaster Management Act of 2005, the District Disaster Management Authority operates under the leadership of the District Magistrate. As chairperson, the District Magistrate coordinates disaster risk reduction plans, emergency mitigation protocols, and multi-departmental response strategies across the district, including managing major forest fire disasters.

47. (D) Executing controlled counter-firing or back-burning operations from secure baselines
Counter-firing, or back-burning, is a specialized tactic employed when intense surface fires advance rapidly. Firefighters ignite a controlled fire from a established control line, directed toward the main fire front. As the secondary fire burns backward, it consumes intervening dry vegetation, creating a wide fuel-free barrier that starves the main fire.

48. (C) Carbon monoxide (CO) gas and fine particulate matter
Biomass combustion during forest fires produces dense smoke clouds containing high levels of fine particulate matter and toxic carbon monoxide gas. Carbon monoxide reduces oxygen delivery in the bloodstream, causing severe dizziness and systemic toxicity. Inhaling fine particulates causes severe acute respiratory distress among frontline firefighting crews and fringe village residents.

49. (B) To provide real-time thermal imagery of fire fronts and hotspots through smoke
Unmanned Aerial Vehicles equipped with infrared thermal sensors provide critical aerial surveillance during active forest fires. Drones fly through thick smoke clouds to capture real-time thermal imagery, mapping precise fire perimeter locations, active hotspots, and spread direction. This aerial intelligence enables operational commanders to deploy firefighting crews safely and effectively.

50. (D) I, II, and IV only
Drought management in forests involves constructing artificial waterholes to retain wildlife and executing silvicultural thinning to reduce water competition among trees. Afforestation using drought-tolerant native species builds long-term landscape resilience. Conversely, drought severe conditions dramatically increase forest fire hazards by drying out vegetation and ground litter, rendering fuel highly combustible.

51. (A) State government compensation schemes and rural crop insurance (PMFBY)
Crop damage caused by wildlife forced out of burnt or flooded forests is addressed through state institutional frameworks. State forest departments provide ex-gratia financial relief for wildlife depredation, while agricultural insurance schemes like Pradhan Mantri Fasal Bima Yojana cover localized crop losses, providing financial safety nets for vulnerable fringe farming communities.

52. (C) Lantana (Lantana camara)
Lantana camara is a aggressive invasive shrub that forms impenetrable thickets across forest understories in the Shivalik and Vindhyan belts. It smothers native seedlings, halting natural forest regeneration. Containing volatile aromatic oils, its dry woody stems create heavy fuel loads that readily ignite, escalating minor surface fires into high-intensity blazes.

53. (A) Fire behavior prediction software like FARSITE or Prometheus
Computer simulation software like FARSITE and Prometheus models spatial fire behavior and spread patterns across complex landscapes. By integrating spatial fuel models, topographical elevation, relative humidity, and wind vectors, these systems calculate rate of fire spread, flame length, and intensity, assisting forest managers in planning proactive fire suppression strategies.

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54. (D) Illegal mining causes severe soil erosion, habitat fragmentation, and heavy metal pollution
Unregulated illegal mining operations within and around forest boundaries destroy vegetation cover and destabilize soil structures. Excavation alters river channels, accelerates topsoil erosion, and disrupts wildlife corridors. Heavy machinery operation and toxic run-off introduce severe heavy metal pollution into forest watersheds,

oxbows, and natural wetlands in protected forests. Forming thick floating mats across water surfaces, it blocks sunlight, depletes dissolved oxygen levels, and accelerates siltation. This infestation severely degrades aquatic biodiversity and chokes critical wetland ecosystems.

74. (A) Forest fire control operations and soil-moisture conservation works
Compensatory Afforestation Fund Management and Planning Authority funds are legally dedicated to forest protection, enhancement, and restoration activities. Authorized expenditures include constructing soil and moisture conservation structures, establishing fire lines, purchasing firefighting tools, engaging seasonal fire watchers, and executing afforestation projects to maintain overall ecological stability across forest divisions.

75. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Stationing fire watchers on elevated watchtowers during summer months provides clear visual coverage over surrounding forest canopies. Detecting rising smoke plumes early enables immediate triangulation of fire locations. Rapid communication allows field crews to reach and extinguish surface fires before high winds elevate them into catastrophic crown fires.

76. (B) It decreases ice albedo (reflectivity), absorbing more heat and accelerating glacial melt
Massive forest fires release large volumes of fine black carbon particles into the upper atmosphere. When wind currents deposit these dark soot particles onto snowfields and Himalayan glaciers, the surface albedo decreases significantly. Reduced reflectivity causes the ice to absorb greater solar radiation, leading to elevated temperatures and accelerated glacial melting.

77. (A) LiDAR (Light Detection and Ranging)
Light Detection and Ranging technology uses airborne laser sensors to pulse light beams toward the earth surface, measuring reflection return times. This process generates highly accurate three-dimensional elevation models of forest canopy structures, understory vegetation, and ground topography. LiDAR enables precise mapping of fuel accumulation levels and slope stability risks.

78. (C) An artificial water catchment and storage device providing water for wildlife
A wildlife guzzler is an artificial water collection and storage structure constructed in dry forest compartments. Designed to capture and store precipitation or surface runoff in sheltered subterranean tanks, it provides a reliable water source for wild animals during extended summer droughts, minimizing wildlife dehydration and migration into agricultural areas.

79. (D) State Disaster Response Fund (SDRF) and National Disaster Response Fund (NDRF)
Statutory disaster relief financing in India operates primarily through the State Disaster Response Fund and the National Disaster Response Fund established under the Disaster Management Act. These statutory funds allocate direct financial resources to state authorities for emergency response, immediate relief deployment, and tactical firefighting during major natural disasters.

80. (C) II and IV only
The dry deciduous forests of the Vindhyan region experience frequent summer fires, largely triggered by human activities such as burning leaf litter to collect Mahua flowers and Tendu leaves. Natural fires caused by lightning remain extremely rare in Uttar Pradesh, while Terai forests experience seasonal summer fire risks despite monsoon flooding.

81. (B) International Union for Conservation of Nature (IUCN) with UN support
The Global Fire Monitoring Center was established through international ecological initiatives supported by the United Nations and the International Union for Conservation of Nature. Operating as a global portal, it collects, analyzes, and shares real-time wildland fire data, early warning predictions, and fire management expertise to enhance global disaster mitigation capabilities.

82. (D) Increased risk of deadly landslides and debris flows during heavy rains
Tree roots naturally bind slope soil and anchor sub-surface rock strata. Uncontrolled illegal tree felling removes this critical biological anchoring system, leaving steep hillsides unstable. During intense monsoonal rainstorms, water-logged bare soil quickly loses cohesion, resulting in devastating landslides, mudslides, and debris

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remote sensing and spatial algorithms, the platform provides near real-time monitoring of global forest cover changes, tree cover loss, and satellite-based forest fire thermal alerts.

158. (C) Sever phloem to dry out trees for illegal harvesting as dead wood
Girdling is an illegal technique where a continuous ring of bark and outer phloem tissue is cut away around a tree trunk. Interrupting downward nutrient transport starves the root system, causing the tree to die standing over several months. Smugglers exploit this practice to harvest high-value timber under the guise of collecting deadwood.

159. (D) Facilitating the rapid spread of invasive desert locust swarms
Intact forest ecosystems provide critical natural disaster mitigation services, including reducing monsoonal flood peaks, binding slope topsoil to prevent landslides, and regulating microclimates. Facilitating the rapid spread of invasive desert locust swarms is not an ecological benefit; locust swarms are agricultural pests influenced by desert weather and winds.

160. (C) By physically smothering the flames, thereby cutting off atmospheric oxygen supply
A fire beater is a traditional manual firefighting tool consisting of a long handle fitted with a flexible rubber flap or green leafy branches. When struck forcefully against low surface flames, the flat surface smothers the fire, physically displacing ambient air and cutting off the atmospheric oxygen supply required to sustain combustion.

161. (B) An area with temperatures significantly above surroundings, indicating fire
In satellite remote sensing, a thermal anomaly represents a ground pixel displaying surface brightness temperatures significantly higher than surrounding baseline ambient readings. Spaceborne thermal sensors detect these intense heat signatures, identifying active biomass burning, surface forest fires, or industrial heat sources for rapid verification by ground personnel.

162. (D) It prevents natural predators from moving across landscapes to control pest populations
Fragmenting forests with linear infrastructure creates physical barriers that disrupt contiguous habitats. Habitat isolation restricts the movement of natural insect predators, including insectivorous birds, small mammals, and predatory arthropods. Without natural biological controls moving freely across landscapes, opportunistic insect pest populations rapidly surge, causing destructive forest outbreaks.

163. (A) The respective State Forest Department
Under the Indian constitutional framework, state governments hold primary administrative responsibility over forest management. The respective State Forest Department acts as the nodal agency responsible for executing preventive fire management, maintaining fire lines, deploying field guards, operating suppression infrastructure, and managing overall disaster response within state forest boundaries.

164. (C) It burns deep underground in organic soil, smoldering for months and defying suppression
A subterranean or ground fire burns beneath the surface within accumulated organic soil, peat layers, and decaying root networks. Characterized by slow, flameless smoldering and dense smoke production, subterranean fires can persist undetected underground for months, bypassing surface water suppression and reigniting surface blazes during dry weather.

165. (B) National Disaster Response Force (NDRF)
When severe natural disasters like catastrophic forest fires exceed state operational capacities, the central government deploys the National Disaster Response Force. Operating under the National Disaster Management Authority, this specialized federal force provides trained personnel, advanced equipment, emergency rescue, and direct containment support to manage major disaster events.

166. (D) Before the onset of the dry summer season by February/March
Pre-fire operations, including clearing fire lines and removing accumulated leaf litter, must be completed before the dry summer season begins. In Uttar Pradesh, forest departments strictly enforce completing these preventive measures by February or March, ensuring bare-soil barriers are fully established before soaring temperatures and high winds escalate fire risks.

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92. (B) Annually, prior to the onset of vulnerable fire or monsoon seasons
Forest Disaster Management Plans must be reviewed and updated annually prior to peak hazard periods. Regular annual revisions ensure that fire line locations, equipment inventories, communication networks, and personnel contact directories reflect current ground conditions. Updating plans before dry summer or monsoon seasons optimizes organizational preparedness and operational response capability.

93. (A) Conducting mock drills, checking fire lines, and maintaining equipment
Preparedness in disaster management focuses on pre-event operational readiness to ensure effective emergency response. Key preparedness measures mandated by disaster guidelines include maintaining cleared fire lines, inspecting firefighting tools, conducting regular staff mock drills, setting up early alert networks, and assigning clear operational roles to field staff before fire seasons initiate.

94. (C) Mirzapur and Sonbhadra
Kaimur Wildlife Sanctuary is located across Mirzapur and Sonbhadra districts in southern Uttar Pradesh. The sanctuary consists primarily of dry deciduous forests and open scrub vegetation situated on rocky plateau terrain. High summer temperatures and dry surface conditions render these forest areas extremely vulnerable to seasonal fires.

95. (D) A fire ascending from ground to tree canopy, spreading rapidly through treetops
A crown fire is a high-intensity forest fire that climbs from ground vegetation into the upper tree canopy, spreading rapidly through treetops. Driven by strong atmospheric winds and fueled by dense foliage, crown fires burn with extreme heat, destroying mature forest stands and presenting severe containment challenges to firefighting crews.

96. (C) Giving local communities a stake in forest resources incentivizes them to protect forests from fires
Joint Forest Management operates on the premise that involving local communities in forest protection and granting them usufruct rights creates strong economic ownership. When fringe villagers benefit from timber and non-timber forest produce, they are motivated to prevent illegal activities, clear fire lines, report smoke early, and suppress surface fires.

97. (B) Highways offer dry highlands during floods, though animals face vehicle collisions and poaching
Severe seasonal flooding inundates low-lying riverine national parks like Kaziranga and Dudhwa, submerging critical wildlife habitats. Wild animals migrate toward elevated terrain, often seeking refuge along elevated arterial highways and forest fringes. While highlands provide safety from drowning, displaced animals face severe risks from vehicular collisions, poaching, and human conflict.

98. (D) Seedlings possess established roots, ensuring higher survival against weeds and harsh weather conditions
Raising seedlings in polybags creates robust root system structures within protected nursery environments before field planting. When transplanted into degraded post-disaster sites, polybag seedlings establish rapidly and withstand weed competition, soil moisture stress, and harsh atmospheric weather far better than direct seed sowing, ensuring significantly higher field survival rates.

99. (A) Developing thick, corky bark that insulates cambium layers from intense surface heat
Certain native tree species evolving in fire-prone ecosystems possess morphological adaptations like thick, corky bark layers. Corky bark acts as an effective thermal insulator, shielding underlying vascular cambium tissues from high temperatures generated by surface fires. This insulation prevents lethal vascular heat damage, allowing trees to survive periodic ground blazes.

100. (C) I and III only
Forest disaster risk mapping integrates hazard identification, element vulnerability, and coping capacity. Vulnerability mapping identifies exposed ecological and human assets, including critical habitats, infrastructure, and fringe settlements. Hazard mapping evaluates active environmental threat dynamics rather than bedrock geological age alone, allowing accurate risk calculation for effective mitigation planning.

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120. (A) III, I, II, IV
Managing forest pest outbreaks requires a structured sequential approach. Ground staff first maintain regular surveillance to detect abnormal tree mortality early. Upon detection, specialists identify the pest species and map the affected forest area. Integrated pest management measures, including biological or targeted chemical controls, are then applied, followed by post-treatment monitoring.

121. (D) Penalizing activities like kindling, carrying, or leaving fires burning in Reserved Forests
The Indian Forest Act of 1927 provides statutory legal provisions to protect state forest lands. It strictly prohibits kindling, carrying, or leaving fires burning within Reserved Forests. The legislation empowers forest officers to penalize offenders, confiscate equipment used in forestry offenses, and enforce legal accountability to prevent anthropogenic fire disasters.

122. (A) It forms thickets replacing edible native grasses, degrading habitat quality
The aggressive proliferation of Lantana camara forms dense, impenetrable thickets that crowd out native grasses, herbs, and edible undergrowth. Because wild herbivores like deer find Lantana unpalatable, the loss of native forage degrades critical grazing habitats, leading to food scarcity, reduced herbivore carrying capacity, and increased wildlife straying.

123. (B) It establishes quickly in harsh, degraded, or burnt open environments, stabilizing soil
Pioneer tree species possess ecological traits such as rapid germination, high light tolerance, wind-dispersed seeds, and fast growth rates. These species colonize open, harsh, or fire-damaged landscapes where topsoil is exposed. By quickly covering bare ground, pioneer species stabilize loose soil, prevent severe erosion, and create favorable microclimates for secondary ecological succession.

124. (B) High temperature combined with low humidity and strong winds
Environmental risk factors for forest fires peak during the pre-monsoon summer season in North India. High ambient temperatures rapidly evaporate moisture from living foliage and ground litter. When combined with extremely low relative humidity and strong surface winds, dry organic matter becomes highly combustible, accelerating fire ignition rates and fire spread dynamics.

125. (A) Early warning and preparedness
The Forest Fire Danger Rating System is an operational risk assessment tool focused on early warning and pre-disaster preparedness. By analyzing meteorological data, vegetation greenness, and fuel moisture levels, the system forecasts potential fire hazard levels across forest zones, enabling authorities to issue early warnings and pre-position suppression crews.

126. (C) They possess massive soil seed banks and rapid vegetative regeneration capabilities
Eradicating invasive weed species requires sustained multi-year management because these plants produce vast quantities of long-lived seeds that remain dormant within topsoil seed banks. Additionally, many invasive weeds exhibit strong vegetative reproduction from root fragments, allowing rapid recolonization following initial clearing unless control measures are consistently maintained over time.

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127. (D) The National Action Plan on Climate Change (NAPCC)
The National Action Plan on Climate Change established overarching frameworks addressing environmental vulnerability in India. Recognizing increasing fire risks driven by rising temperatures, the plan emphasized climate-resilient forest management. This mandate led to the development of the National Action Plan on Forest Fires, dedicated to enhancing prevention, monitoring, and community participation.

128. (C) To spot smoke plumes across tree canopies and triangulate locations of early fires
Fire watch towers are elevated structural observation posts constructed at vantage points across forest divisions. During high-risk dry seasons, stationed watchers continuously monitor surrounding forest canopies for rising smoke plumes. Observing smoke from multiple towers enables precise compass triangulation, allowing field staff to pinpoint exact fire locations for rapid deployment.

129. (B) Removing plant cover and litter increases runoff, causing flash floods and soil erosion
High-intensity forest fires strip away protective canopy leaves, ground vegetation, and absorbent leaf litter. Burning organic matter reduces

up permanent forest check-posts along transit routes and empowering officers under the Indian Forest Act to confiscate vehicles helps curb timber smuggling. Smugglers target high-value commercial timber species like Teak and Sal rather than non-commercial trees.

111. (D) Forest Survey of India (FSI)
The Forest Survey of India, a premier national organization under the environment ministry, publishes the India State of Forest Report biennially. The agency conducts nationwide mapping of forest cover, assesses growing stock, tracks changes in vegetation canopy, and publishes spatial assessments of fire-prone forest zones using satellite-based remote sensing data.

112. (C) To act as a shock absorber mitigating human-wildlife conflict and absorbing pressures before core areas
Establishing buffer zones around protected core forests creates transitional management areas that absorb external human pressures. Buffer zones accommodate regulated community resource use, ecotourism, and habitat management activities. By acting as protective physical shock absorbers, buffer zones minimize human-wildlife conflict, prevent direct habitat encroachment, and shield core wilderness from environmental disturbances.

113. (B) Dense coniferous forests with heavy ladder fuels and strong winds
Crown fires require continuous canopy fuel layers and strong atmospheric winds to sustain spread across treetops. Dense coniferous forests containing highly flammable resinous foliage, combined with abundant understory ladder fuels like shrubs and low branches, create ideal physical conditions for surface fires to leap into canopies and transform into destructive crown fires.

114. (D) Vegetation like shrubs and low branches allowing surface fires to climb into forest canopies
In forest fire terminology, ladder fuel refers to vertical vegetation structures such as tall grasses, invasive shrubs, small understory trees, and low-hanging branches. These fuel layers bridge the physical gap between ground litter and tree crowns, allowing minor surface fires to climb upward into the high canopy, sparking severe crown fires.

115. (A) P-2, Q-4, R-1, S-3
Specific tools and operational procedures serve key functions in forest fire management. The FSI FAST system provides real-time satellite SMS alerts. Ground checking involves field verification of thermal anomalies by beat staff. Fire beaters are physical tools used to smother surface flames, while controlled burning reduces ground fuel before fire seasons.

116. (C) A practice simulation of emergencies like fires to test response readiness of staff and equipment
A mock drill is a simulated emergency preparedness exercise conducted by forest departments to evaluate operational readiness. By simulating real-world scenarios such as sudden crown fires or flash floods, mock drills test communication networks, equipment functionality, response times, and inter-agency coordination, identifying operational bottlenecks before actual disasters occur.

117. (A) NDMA sets national policy guidelines, while SDRF acts as the state ground response force
The National Disaster Management Authority operates as the apex federal body responsible for formulating national policies, risk reduction frameworks, and disaster management guidelines. In contrast, the State Disaster Response Force functions as a specialized state-level operational response force deployed directly on the ground to execute search, rescue, and emergency containment operations.

118. (D) Its low-lying flat terrain crossed by rivers descending rapidly from the Himalayas
The Terai region of Uttar Pradesh comprises low-lying, flat alluvial plains situated along the Himalayan foothills. Numerous major rivers originating in the high mountains flow rapidly downward into this gentle plain. During heavy monsoons, sudden volume surges cause river channels to overflow, inundating surrounding forests and plains with floodwaters.

119. (B) A cleared vegetation strip maintained by forest departments to halt fire spread
An artificial fire line is a strategically constructed strip of land cleared manually or mechanically of all vegetation, ground litter, and organic debris down to bare mineral soil. Maintained regularly by forest departments, these cleared barriers disrupt continuous fuel beds, preventing surface fires from spreading across forest compartments.

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recycling locked nutrients back into topsoil, and triggering heat-induced seed germination in specialized fire-adapted forest plant species.

139. (B) Floods, by altering river morphology and accelerating bank erosion
Illegal mining of sand, gravel, and boulders from riverbeds passing through forest zones severely destabilizes river ecosystems. Excessive excavation deepens river channels, alters natural flow paths, and accelerates bank erosion during high-discharge monsoonal flows. These morphological disruptions weaken flood protection embankments, significantly worsening seasonal flood hazards.

140. (B) II, III, and IV only
Modern early warning systems integrate real-time satellite remote sensing data with atmospheric weather inputs. The Forest Survey of India processes MODIS and VIIRS satellite data to detect active thermal anomalies, broadcasting instant alerts to state officers and beat guards. Dense cloud cover can temporarily obstruct satellite thermal sensors from detecting ground fires.

141. (A) Community mobilization protocols for early fire suppression and identifying escape routes
Micro-plans drafted at the village level under Joint Forest Management establish localized disaster management frameworks. These participatory plans incorporate community mobilization protocols for early fire suppression, assign volunteer firefighting squads, establish emergency communication channels, clear local fire lines, and map safe escape routes to protect fringe villages during catastrophic forest fires.

142. (C) Statutory National Disaster Response Fund (NDRF)
The Disaster Management Act of 2005 mandates establishing the National Disaster Response Fund as a dedicated statutory fund at the federal level. The fund provides direct financial assistance to state governments for emergency response, immediate relief deployment, and specialized containment operations during catastrophic natural disasters that exceed state financial capacities.

143. (D) Mahua (Madhuca longifolia)
Madhuca longifolia, commonly known as Mahua, is a highly valued tree species in the Vindhyan region. During early spring, local villagers clear fallen leaf litter beneath Mahua trees by burning the forest floor to facilitate gathering falling edible flowers and seeds. These localized collection fires frequently escape control, triggering extensive dry surface fires.

144. (C) Cleared of all dry leaves, twigs, and combustible fuels down to mineral soil
Maintaining a clean fire line requires removing all organic material, dry fallen leaves, branches, and undergrowth down to bare mineral soil. Eliminating combustible fuel along these cleared physical strips ensures that advancing surface fires cannot find fuel to cross over, thereby containing blazes within designated forest compartments.

145. (A) P-4, Q-2, R-1, S-3
Different protected areas in Uttar Pradesh face distinct environmental hazards. Hastinapur Wildlife Sanctuary suffers from habitat fragmentation along the Ganga basin. Ranipur Tiger Reserve experiences summer droughts and deciduous fires. Sohagibarwa deals with Gandak river flood inundations, while Dudhwa National Park faces extreme monsoon flooding and siltation.

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146. (D) Ash and sediment run-off causing decreased dissolved oxygen and fish mortality
Severe forest fires consume watershed vegetation, generating large volumes of ash and loose sediment. Post-fire rainstorms flush this material into forest streams, dramatically increasing water turbidity. Suspended sediment and organic ash deplete dissolved oxygen levels and clog fish gills, leading to severe mortality among aquatic fauna and long-term stream degradation.

147. (A) Planting monocultures of flammable exotic species like Eucalyptus
Planting monocultures of highly flammable exotic tree species like Eucalyptus on fire-damaged slopes is ecologically unsound. Resinous exotic monocultures increase future fire risks, deplete localized groundwater tables, and fail to support native biodiversity. Restoration should instead focus on multi-species planting of deep-rooted native vegetation alongside physical soil conservation structures.

topsoil infiltration capacity and exposes bare soil to direct rainfall impact. Consequently, surface runoff increases dramatically during heavy rainstorms, causing severe topsoil erosion, watershed degradation, and destructive downstream flash floods.

130. (D) I and III only
Unmanned Aerial Vehicles provide safe aerial surveillance over disputed or inaccessible forest areas without placing ground personnel at risk. Equipped with specialized vegetation sensors like NDVI, drones monitor canopy vigor, detect early pest stress, and map canopy gaps. Modern drones operate effectively in mountainous terrain, offering valuable spatial data for disaster management.

131. (A) Continuous Contour Trenches (CCT)
Continuous Contour Trenches are soil moisture conservation structures excavated horizontally along hillslope contours in degraded forest catchments. These physical trenches intercept surface runoff during rainstorms, break water velocity, trap eroding topsoil, and facilitate sub-surface water infiltration. Trenching recharges localized groundwater tables, supporting vegetation survival during dry spells.

132. (C) Yes, if the crop is insured and localized calamities are covered under scheme rules
The Pradhan Mantri Fasal Bima Yojana offers comprehensive risk insurance coverage for agricultural crops against non-preventable natural risks. If an uncontrolled forest fire spreads into adjoining insured agricultural fields causing crop destruction, affected farmers can claim financial indemnity under localized calamity provisions, provided notice is submitted within stipulated timelines.

133. (A) Approximately 35%
Assessments published by the Forest Survey of India indicate that approximately 35 percent of the country's total forest cover is subject to varying degrees of fire vulnerability, ranging from extremely prone to moderately prone zones. Dry deciduous forest ecosystems constitute the majority of these fire-vulnerable forest areas across India.

134. (D) United States Agency for International Development (USAID)
The Forest-PLUS program is a bilateral technical partnership between the Ministry of Environment, Forest and Climate Change and the United States Agency for International Development. The initiative focuses on developing advanced tools, ecosystem management practices, and technical capacity to enhance forest carbon sequestration, improve landscape health, and build disaster resilience.

135. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Controlled back-burning is a high-risk indirect firefighting method requiring expert knowledge of local wind behavior and topography. Firefighters ignite a counter-fire from a control line to burn toward the main fire front. If wind direction abruptly shifts, the back-burn can jump containment lines, creating an secondary uncontrolled fire front.

136. (C) Construction of retaining walls, gabions, and planting deep-rooted Vetiver grass
Preventing landslides on unstable, degraded forest slopes requires combining bio-engineering techniques with physical engineering structures. Constructing stone gabions and concrete retaining walls provides immediate structural slope support. Concurrently, planting deep-rooted soil-binding vegetation like Vetiver grass stabilizes topsoil layers, anchors loose slope material, and significantly reduces erosion risks.

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137. (D) Remote Sensing Applications Centre (RSAC-UP)
The Remote Sensing Applications Centre, Uttar Pradesh, serves as the premier state agency for spatial data collection and satellite imagery analysis. Working alongside the state forest department, the center utilizes satellite remote sensing and Geographic Information Systems to map fire vulnerability zones, monitor flood inundations, and assess post-disaster landscape damage.

138. (A) They completely destroy the root systems of all mature trees.
Low-intensity surface fires do not destroy mature tree root systems protected beneath the soil. Instead, periodic natural surface blazes provide ecological benefits by consuming dry ground litter, reducing hazardous fuel accumulation,

101. (A) Severe respiratory issues and contact dermatitis
Parthenium hysterophorus, commonly known as Congress grass, is an aggressive invasive weed that colonizes degraded forest edges and degraded lands. The plant releases toxic airborne pollen grains and particulate trichomes containing parthenin. Human exposure or direct physical contact causes severe medical issues, including chronic allergic contact dermatitis, asthma, and severe respiratory tract inflammation.

102. (D) To protect forests from fires using modern technology and local participation
The National Forest Policy of 1988 emphasizes protecting forest ecosystems from destructive natural and anthropogenic fires. It mandates adopting advanced technology, spaceborne remote sensing alerts, and scientific fire management practices. Simultaneously, the policy stresses mobilizing fringe village communities to participate actively in preventive fire management and ground suppression operations.

103. (B) The Range Forest Officer (RFO) or local Forester
At the operational field level, tactical firefighting operations within a forest range are directly commanded by the Range Forest Officer or local Forester. They coordinate frontline beat guards, organize seasonal fire watchers, allocate firefighting equipment, and direct tactical ground suppression and counter-firing maneuvers during active fire emergencies.

104. (C) By destroying soil microbes, volatilizing key nutrients like nitrogen, and removing organic humus
Recurrent forest fires destroy topsoil organic matter and leaf litter, eliminating essential soil micro-organisms responsible for nutrient cycling. Intense combustion heat volatilizes essential soil nutrients, particularly organic nitrogen and sulfur. Continuous loss of organic humus degrades soil structure, reduces water retention capacity, and accelerates long-term soil fertility decline.

105. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Drones equipped with high-resolution thermal cameras are highly effective tools during post-fire mop-up operations. Thermal sensors detect invisible underground smoldering, burning root systems, and concealed hotspots beneath ash layers. Locating and extinguishing these hidden heat sources prevents wind-driven reignition, securing the burnt perimeter against secondary fire outbreaks.

106. (A) Babul (Acacia nilotica)
Acacia nilotica, commonly known as Babul, is a drought-resistant native tree species ideally suited for afforestation in arid and semi-arid regions. Featuring deep taproots, reduced leaf surface areas, and physiological water-conservation mechanisms, Babul thrives in low-rainfall environments like Bundelkhand, making it an excellent choice for social forestry projects.

107. (B) The Forest Rights Act, 2006 and disaster relief funds
When forest-dwelling communities experience severe livelihood disruptions or loss of minor forest produce due to destructive fires, the Forest Rights Act of 2006 protects their statutory community forest resource rights. State authorities utilize this legal framework alongside state disaster relief funds to provide necessary rehabilitation support, resource restoration, and economic compensation.

108. (B) Dry deciduous forests
Biennial assessments by the Forest Survey of India indicate that dry deciduous forests represent the most fire-prone vegetation type in India. These ecosystems shed heavy leaf litter during early spring, creating continuous, dry fuel beds on the forest floor. Combined with high summer temperatures, low humidity, and anthropogenic ignition sources, dry deciduous forests experience frequent surface fires.

109. (A) The Paris Agreement (UNFCCC)
The Paris Agreement, negotiated under the United Nations Framework Convention on Climate Change, is a legally binding international treaty aimed at limiting global warming. By committing nations to reduce greenhouse gas emissions and enhance forest carbon sinks, the agreement targets root drivers of global climate change, mitigating heatwaves, extended droughts, and severe forest fire disasters.

110. (C) I, II, and III only
Illegal timber operations exploit forest streams to float felled timber out of remote areas. Setting

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148. (C) Severe crown fires converting living biomass into atmospheric carbon
Carbon sequestration relies on trees capturing atmospheric carbon dioxide and storing it within living biomass and forest soils. High-intensity crown fires rapidly destroy living tree canopies and organic soil layers, releasing centuries of sequestered carbon back into the atmosphere as greenhouse gases and transforming carbon sinks into major carbon sources.

149. (A) Geographic Information Systems (GIS)
Geographic Information Systems enable spatial overlay and complex analysis of multiple environmental datasets. By integrating topographical elevation, slope aspect, vegetation density, fuel models, and historic weather parameters, GIS technology allows forestry researchers and disaster planners to model hazard risks, identify vulnerable zones, and design strategic mitigation plans.

150. (D) Vilayati Babul (Prosopis juliflora)
Prosopis juliflora, known as Vilayati Babul, was widely introduced to green arid landscapes and stabilize soil. However, its deep taproot system aggressively depletes groundwater tables, while its dense thickets suppress native vegetation through allelopathic chemicals. Recognizing its ecological harm, forestry authorities now consider it an aggressive invasive species requiring systematic control.

151. (B) The Forest (Conservation) Act, 1980
The Forest Conservation Act of 1980 is landmark national legislation regulating the diversion of forest land for non-forestry uses such as mining, dams, and highways. Mandatory central approval, rigorous environmental impact assessments, and compensatory afforestation requirements prevent arbitrary deforestation, mitigating ecological degradation and associated natural disasters.

152. (C) Extinguishing burning material near control lines after main fire passage to secure edges
Mop-up is a critical final phase in forest firefighting conducted immediately after the main fire front is extinguished. Field crews systematically inspect the control line perimeter, extinguishing smoldering stumps, buried roots, hot ash pockets, and burning snags near containment boundaries. Thorough mop-up prevents hidden hotspots from reigniting secondary surface fires.

153. (D) Exacerbation of respiratory illnesses due to severe smoke and particulate pollution
Large forest fires release dense plumes of smoke containing hazardous fine particulate matter, carbon monoxide, and volatile organic compounds into the atmosphere. Wind currents transport smoke pollution over long distances to nearby fringe communities and cities, causing severe acute respiratory distress, triggering asthma attacks, and aggravating cardiovascular diseases.

154. (A) The District Magistrate or designated senior forest official
Under the Incident Command System framework adopted for disaster management, a designated senior authority assumes overall operational leadership during major multi-agency emergencies. In catastrophic forest fires spanning administrative divisions, the District Magistrate or a designated senior forest officer acts as Incident Commander, directing resource allocation, logistics, and inter-departmental response.

155. (B) Natural sponges storing monsoon water, slowly releasing it to sustain groundwater and wildlife
Natural forest wetlands act as hydrological sponges that absorb and store massive volumes of floodwater during monsoon seasons. By retaining water across landscapes, wetlands facilitate continuous subterranean groundwater recharge and slowly release water during dry periods. This natural storage maintains base stream flows, sustaining wildlife and vegetation through severe summer droughts.

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156. (B) Uttarakhand
The Shivalik forest circle in northern Uttar Pradesh shares continuous geographical and ecological boundaries with the state of Uttarakhand. Severe forest fires or large-scale wildlife disturbances in this border landscape result in immediate transboundary spillovers, affecting shared wildlife corridors, ecosystems, and operational disaster management efforts across both states.

157. (A) World Resources Institute (WRI)
Global Forest Watch is an open-source online platform established and maintained by the World Resources Institute in collaboration with global partners. Utilizing advanced satellite

flows that destroy downstream habitats and human infrastructure.

83. (A) The ratio of fuel water weight to its oven-dry weight
Fuel moisture content is a key parameter in fire behavior modeling, defined as the ratio of water mass in a vegetative fuel sample to its completely oven-dry mass, expressed as a percentage. Low fuel moisture levels increase vegetation flammability, lower thermal ignition thresholds, and accelerate surface fire spread rates.

84. (C) Shelterwood system
The shelterwood silvicultural system involves removing mature timber through a series of partial shelterwood harvests over time. Retaining a proportion of mature mother trees maintains canopy shade, protects topsoil from erosion, and provides a continuous seed source for natural regeneration. This system prevents habitat destruction and land degradation associated with clear-felling operations.

85. (A) P-2, Q-1, R-4, S-3
Distinct ecological zones face specific environmental hazards. The low-lying Terai landscape experiences recurrent monsoon flooding. The dry deciduous Vindhyan hills suffer intense summer fires and droughts. Forest fringes in the Gangetic plains face agricultural encroachment, while protected wetland sanctuaries experience severe choking from invasive aquatic weeds.

86. (D) Bark beetles and wood borers
Bark beetles and wood-boring insects lay eggs within outer bark crevices. Emerging larvae construct extensive gallery networks, tunneling through the living cambium and phloem layers. This structural damage disrupts nutrient and water transport, effectively girdling affected trees. Severe infestations lead to canopy dieback, structural failure, and widespread tree mortality.

87. (B) It smothers undergrowth, buries seeds too deep to germinate, and alters stream courses
Heavy silt deposition during forest floods coats the forest floor with dense layer of fine sediment. Excess silt smothers herbaceous undergrowth, blocks seedling emergence, and buries natural seed banks beyond viable germination depths. Additionally, silt accumulation raises riverbed levels, altering stream morphology and disrupting natural aquatic and riparian habitats.

88. (C) Mild winters fail to kill overwintering pests, causing early spring outbreaks
Climate change induces shifts in seasonal timing, leading to milder winter temperatures across forest biomes. Warm winters fail to induce mortality among overwintering insect larvae and egg masses, leading to high survival rates. Consequently, pest populations emerge earlier in spring, resulting in rapid population spikes and extensive tree defoliation.

89. (D) Expansion of the natural territorial range of apex predators like tigers
Unchecked illegal human encroachment degrades core protected areas, fragmenting contiguous wilderness and creating sharp edge effects. Encroachment introduces domestic livestock diseases, disrupts natural migration corridors, and reduces wild prey availability. Far from expanding predator territories, habitat degradation restricts available home ranges, increasing territorial displacement and conflict with humans.

90. (B) Bare soil → Pioneer species (grasses/weeds) → Shrubs and young trees → Mature climax forest
Secondary ecological succession following a stand-replacing fire begins on exposed bare soil. Rapidly colonizing pioneer species like annual grasses and herbaceous weeds establish first, stabilizing topsoil. Over time, fast-growing shrubs and sun-tolerant pioneer trees shade out early weeds, establishing conditions suitable for shade-tolerant species to re-establish a mature climax forest.

91. (B) Visual and Infrared Imaging Radiometer Suite
VIIRS stands for the Visible Infrared Imaging Radiometer Suite, a sensor operating aboard polar-orbiting satellites including the Suomi-NPP and NOAA series. VIIRS collects high-resolution radiometer imagery across visible and infrared spectral bands, enabling precise thermal anomaly detection, nighttime fire monitoring, and global vegetation health tracking.

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167. (B) Uprooting weeds and planting canopy-forming native trees to shade them out
Managing invasive light-demanding weeds like Lantana camara requires combining physical uprooting with ecological restoration. Uprooting weed thickets removes immediate competition, while planting dense, fast-growing native canopy trees restores natural shade. The resulting closed forest canopy suppresses light-dependent invasive weeds, providing a sustainable long-term solution for forest ecosystem recovery.

168. (C) Granting tenure security creates ownership, motivating communities to protect forests from fires
The Forest Rights Act of 2006 recognizes statutory community forest resource rights for traditional forest-dwelling populations. Granting secure legal tenure fosters long-term stewardship among local communities. Feeling a direct stake in forest health, community members actively protect forest tracts, clear traditional fire lines, report early smoke, and assist in extinguishing surface fires.

169. (D) To reduce water velocity, arrest soil erosion, and recharge groundwater to combat drought
Check dams are small barrier structures constructed across seasonal streams in degraded forest catchments. By slowing water discharge velocity during monsoon rains, check dams trap transported sediment and reduce soil erosion. Trapping surface runoff promotes localized water percolation into sub-surface aquifers, artificial recharge, and long-term soil moisture retention against drought.

170. (A) Assess the situation, suppress small surface fires, and inform higher officials for backup
Upon verifying a fire alert on the ground, a forest beat guard must immediately assess fire intensity, wind direction, and potential spread hazards. If the blaze is a localized surface fire, the guard uses manual tools to suppress it instantly. Simultaneously, the officer reports situation details to higher authorities to mobilize additional backup crews.

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lodges.
(C) It systematically replaces native forest flora with exotic ornamental plants for tourists.
(D) It shifts the entire natural wild animal population from forests to urban managed zoos.

75. To increase forest produce productivity through sustainable forest management, which silvicultural practice is commonly adopted for bamboo?
(A) Clear felling the entire standing bamboo clump every single year
(B) Selective culm harvesting, retaining mixed ages in clumps
(C) Uprooting the root rhizome completely following the first harvest
(D) Spraying heavy chemical herbicides around the entire bamboo clump

76. In sustainable forest management, what is the purpose of 'enrichment planting'?
(A) To plant genetically modified commercial agricultural food crops inside natural forests
(B) To introduce native NTFP species into degraded forest lands for higher productivity
(C) To replace natural native forests entirely with commercial plantations of exotic species
(D) To reduce the natural soil fertility deliberately to inhibit undergrowth vegetation

77. Consider the following statements regarding Joint Forest Management (JFM):
Assertion (A): The Joint Forest Management (JFM) concept involves a partnership between the Forest Department and local communities.
Reason (R): JFM entitles the protecting communities to a share in the usufructs (like NTFPs) and a portion of the final timber harvest.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

78. Which policy document fundamentally shifted the focus of Indian forestry from commercial timber extraction to conservation and meeting the basic needs of local communities (including NTFP rights)?
(A) National Forest Policy, 1952
(B) Indian Forest Act, 1927
(C) National Forest Policy, 1988
(D) Forest (Conservation) Act, 1980

79. Under the Forest (Conservation) Act, 1980, the diversion of forest land for non-forestry purposes requires the prior approval of:
(A) The State Chief Minister and State Cabinet
(B) The Central Government (MoEFCC)
(C) The District Magistrate of the area
(D) The local Gram Panchayat executive body

80. The rural economy in forested regions is deeply interdependent on forest produce. Which of the following is an example of an indirect economic benefit derived from forests by rural agriculture?
(A) Direct commercial sale of standing timber to urban industrial construction markets
(B) Illegal poaching and hunting of wild animal populations for commercial meat markets
(C) Setting up heavy industrial chemical manufacturing factories inside forest reserves
(D) Forests acting as watersheds that recharge groundwater for agricultural irrigation

81. How does the availability of fodder and grazing resources in forests directly support the rural economy?
(A) It sustains the rural livestock and dairy sector.
(B) It promotes large-scale mechanized industrial farming.
(C) It forces small farmers to completely abandon agriculture.
(D) It increases the rural demand for synthetic chemical fertilizers.

82. What does 'Forest Certification' primarily assure the consumer of a forest product?
(A) That the product is manufactured to be the absolute cheapest item in the retail market
(B) That the product comes from a sustainably managed forest following strict standards
(C) That the product is completely synthetic and contains no natural wood or forest derivatives
(D) That the product was illegally harvested and smuggled through unverified supply chains

83. Which of the following is a globally recognized organization that provides forest certification?
(A) World Trade Organization (WTO)
(B) Forest Stewardship Council (FSC)
(C) International Monetary Fund (IMF)
(D) World Intellectual Property Organization (WIPO)

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9. Which of the following is an example of an industrial use for Khair (Acacia catechu) wood?
(A) Manufacturing of high-tension electrical utility transmission poles
(B) Production of heavy-duty railway sleepers for track support
(C) Extraction of Kattha for human consumption and leather dyeing
(D) Processing into commercial structural plywood sheets and veneers

10. The concept of Non-Timber Forest Produce (NTFP) emphasizes which of the following ecological principles?
(A) Complete clear-felling of mature timber forests to maximize economic undergrowth
(B) Systematic replacement of natural native forests with monoculture cash crop species
(C) Total and complete restriction of human entry and resource use in forest areas
(D) Sustainable extraction of produce without destroying the primary source tree

11. Which NTFP is famously known as the "Green Gold" of Odisha and central Indian forests due to its vast economic impact on local pluckers?
(A) Tendu leaves
(B) Mahua flowers
(C) Sal seeds
(D) Chironji

12. Minor Forest Produce (MFP) constitutes a significant portion of the net forest revenue in India. Which of the following products is NOT included under the statutory definition of MFP?
(A) Brushwood
(B) Commercial Timber logs
(C) Stumps
(D) Fodder

13. Which of the following correctly pairs a Minor Forest Produce with its primary economic application?
(A) Salai gum - Paper manufacturing
(B) Tendu leaf - Bidi rolling
(C) Mahua seed - Perfume distillation
(D) Baib grass - Matchbox splints

14. Match List I with List II and select the correct answer using the options given below.
List I: Timber/Produce
P. Pine (Chir)
Q. Baib grass
R. Tendu leaves
S. Bamboo
List II: Primary Industrial Use
1. Paper pulp
2. Bidi making
3. Resin extraction
4. Scaffolding and handicrafts
(A) P-3, Q-1, R-2, S-4
(B) P-1, Q-3, R-2, S-4
(C) P-3, Q-1, R-4, S-2
(D) P-2, Q-4, R-1, S-3

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15. The Indian Forest Act of 1927 explicitly mentions "caoutchouc". What does this term refer to in the context of forest produce?
(A) Shellac
(B) Sandalwood oil
(C) Natural rubber
(D) Medicinal bark

16. Rauvolfia serpentina, a crucial medicinal plant extracted from Indian forests, is primarily used in the treatment of which condition?
(A) Malaria
(B) Diabetes
(C) Tuberculosis
(D) Hypertension

17. Which part of the Cinchona tree, historically cultivated and extracted from specific forest areas, yields quinine?
(A) Leaves
(B) Roots
(C) Bark
(D) Flowers

18. Find the odd one out among the following based on their classification as medicinal herbs obtained from forests.
(A) Ashwagandha
(B) Sal
(C) Giloy
(D) Sarpagandha

19. What is the principal source of 'Biroja' (turpentine) in the Himalayan and sub-Himalayan forest belts of India, including parts of Uttar Pradesh and Uttarakhand?
(A) Deodar softwood tree (Cedrus deodara)
(B) Sal tree (Shorea robusta)
(C) Teak tree (Tectona grandis)
(D) Chir Pine (Pinus roxburghii)

20. Lac is an important non-timber forest produce. How is natural lac primarily obtained?
(A) From the resinous secretion of lac insects on

(B) Limited access to modern processing technology and institutional credit
(C) Total statutory ban on all forms of minor non-timber forest produce collection in India
(D) Complete unavailability of any functional transport networks in proximity to forests

39. Which small-scale industry is heavily dependent on the collection of 'Katha' and 'Cutch'?
(A) Safety match manufacturing and splint production
(B) Commercial beedi rolling and tobacco processing
(C) Paan (betel) preparation and natural dyeing
(D) Essential oil extraction and fragrance distillation

40. Bidi-rolling is a massive cottage industry in India. Which of the following states is the largest producer of Tendu leaves, the primary raw material for this industry?
(A) Uttar Pradesh
(B) Kerala
(C) Assam
(D) Madhya Pradesh

41. What is the full form of TRIFED, established in 1987 under the Multi-State Cooperative Societies Act?
(A) Tribal Co-operative Rural Indian Federation for Economic Development
(B) Tribal Cooperative Marketing Development Federation of India Limited
(C) Traditional Forest Enterprise and Commercial Development Corporation
(D) Tribal Farmers and Rural Sustainable Enterprises Development Agency

42. Consider the following statements regarding the Tribal Cooperative Marketing Development Federation (TRIFED):
Assertion (A): TRIFED focuses on the retail marketing of tribal products through its "Tribes India" outlets.
Reason (R): Direct retail marketing helps bypass intermediaries, ensuring that a larger share of the profit reaches the tribal artisans and gatherers.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

43. Which of the following initiatives was launched by TRIFED to digitize the tribal commerce ecosystem and connect tribal gatherers directly with urban markets?
(A) E-Choupal
(B) Digital India Land Records
(C) E-Panchayat
(D) Tech For Tribals

44. Sustainable harvesting of forest produce relies on which of the following core principles?
(A) Harvesting rate must not exceed natural regeneration rate of species.
(B) Harvesting should strictly be done using heavy industrial machinery to save labor time.
(C) Only the largest and oldest trees in a forest stand should be completely uprooted.
(D) Chemical fertilizers must be applied post-harvest to speed up overall forest recovery.

45. In the context of sustainable harvesting, what does the term 'Rest Period' or 'Felling Cycle' imply?
(A) The specific hours of the day when entry into reserved forest zones is legally prohibited
(B) Mandated time gap between successive harvests in an area for regeneration
(C) The designated seasonal period during which all forest administrative guards are on official leave
(D) The total estimated time taken to transport harvested goods from forest sites to retail markets

46. Destructive harvesting methods are a major threat to NTFP sustainability. Which of the following is an example of a destructive harvesting practice?
(A) Plucking only mature fruits while carefully leaving all immature ones intact on trees
(B) Tapping pine tree resin scientifically by using the standard rill extraction method
(C) Collecting naturally fallen fresh Mahua flowers directly from the surrounding ground
(D) Lopping off entire branches of Amla trees to collect fruits easily

47. Under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, who holds the ownership rights, access to collect, use, and dispose of minor forest produce?
(A) The Gram Sabha and the recognized forest

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and marketing of nationalized forest produce like Tendu leaves?
(A) Uttar Pradesh State Industrial Development Authority (UPSIDA)
(B) Uttar Pradesh Forest Corporation (UPFC)
(C) Uttar Pradesh Khadi and Village Industries Board
(D) Directorate of Agriculture, UP

30. Nationalization of specific minor forest produce, such as Tendu leaves, was undertaken by various state governments primarily to achieve which of the following objectives?
(A) To eliminate middlemen and ensure fair wages to collectors
(B) To completely ban and restrict the commercial trade of these products
(C) To export the entire harvested produce exclusively to foreign countries
(D) To clear existing natural forests for commercial industrial plantations

31. What is the core objective of the Pradhan Mantri Van Dhan Yojana (PMVDY) launched by the Ministry of Tribal Affairs?
(A) To provide free structural timber to rural tribal populations for house building
(B) To systematically relocate forest dwellers away from protected core tiger reserves
(C) To improve tribal incomes through value addition of forest produce
(D) To distribute legal land titles exclusively to women residing in forest villages

32. Under the Van Dhan Yojana, a standard Van Dhan Vikas Kendra (VDVK) typically comprises how many tribal gatherers?
(A) 10 to 15
(B) 50 to 100
(C) around 300
(D) over 1000

33. Which organization acts as the nodal agency at the national level for the implementation of the Van Dhan Yojana?
(A) NITI Aayog
(B) NABARD
(C) Forest Survey of India
(D) TRIFED

34. What specific mechanism does the Van Dhan Yojana utilize to empower tribal gatherers?
(A) Direct cash transfers equivalent to full market value of all uncollected forest produce
(B) Formation of Self Help Groups for collective processing and marketing
(C) Providing permanent government employment to one working member of every tribal family
(D) Issuing certified and tradable forest carbon credits directly to individual gatherers

35. Consider the following statements regarding the Minimum Support Price (MSP) scheme for Minor Forest Produce (MFP):
I. It was introduced to ensure fair returns to tribal gatherers and protect them from exploitation.
II. The scheme applies to all agricultural crops grown on forest lands.
III. TRIFED recommends the MSP for different MFPs to the Ministry of Tribal Affairs.
IV. State designated agencies undertake procurement when market prices fall below the MSP.
Which of the above statements is/are correct?
(A) I, II and III only
(B) I, III and IV only
(C) II, III and IV only
(D) I, II, III and IV

36. Under the "Mechanism for Marketing of Minor Forest Produce (MFP) through Minimum Support Price (MSP)" scheme, who is primarily targeted as the beneficiary?
(A) Large-scale timber harvesting contractors and private commercial buyers
(B) Prominent exporters of Ayurvedic medicines and herbal product manufacturers
(C) State Forest Department personnel and administrative forest officials
(D) Forest-dwelling Scheduled Tribes and traditional forest dwellers

37. Which of the following forest produce is generally NOT covered under the centrally sponsored MSP for MFP scheme?
(A) Commercial Teak logs
(B) Tamarind
(C) Mahua seed
(D) Sal seed

38. The development of small and cottage industries based on forest produce faces several challenges. Which of the following is considered the most significant bottleneck for such industries?
(A) Excessive oversupply of highly skilled marketing professionals in rural tribal areas

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(A) Tendu leaf collection and Bidi manufacturing
(B) Mechanical sawmill operation and timber cutting
(C) High-end teak furniture carving and finishing
(D) Industrial resin processing in chemical plants

56. Consider the following statements regarding employment generation from forest produce:
I. Bamboo harvesting and processing offer year-round employment in many rural areas.
II. NTFP collection is highly male-dominated, with negligible participation of women.
III. The development of eco-tourism can provide alternative livelihoods, reducing pressure on raw NTFP extraction.
Which of the above statements is/are correct?
(A) I and II only
(B) I and III only
(C) II and III only
(D) I, II and III

57. Which of the following represents a strategy of "value addition" to forest produce at the local level?
(A) Selling freshly harvested raw amla directly to a local middleman trader
(B) Storing harvested raw amla in an open field until market prices rise
(C) Processing raw amla into marketable candies and juices before selling
(D) Cutting down standing amla trees to sell the harvested wood as timber

58. Value addition of Non-Timber Forest Produce at the village level generally leads to which of the following outcomes?
(A) Decrease in the shelf life of the product
(B) Immediate collapse of the local market
(C) Heavy taxation by the central government making it unprofitable
(D) Higher profit margins for the primary gatherers

59. The current status of the international trade of India's forest produce shows strong export demand for which of the following product categories?
(A) Lac, natural gums, resins, and medicinal plant extracts
(B) Raw timber logs harvested from common hardwood species
(C) Unprocessed firewood logs for domestic heating use
(D) Young fresh bamboo shoots harvested for timber use

60. India is one of the world's leading exporters of Guar gum and Karaya gum. Gum Karaya is widely used in which international industry?
(A) Heavy industrial metallurgy as a chemical flux agent
(B) Food, pharmaceutical, and cosmetic industries as a thickener
(C) Automotive manufacturing industry as a synthetic tire additive
(D) Civil construction industry as an eco-friendly cement alternative

61. What major restriction applies to the export of raw timber from natural forests in India?
(A) It is fully encouraged and incentivized through high government export subsidies.
(B) It can only be legally exported to neighboring land-bordering South Asian countries.
(C) There is no statutory restriction or regulatory licensing required on timber exports.
(D) It is strictly regulated or banned to conserve domestic forest resources.

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62. Which district in Uttar Pradesh is historically famous for its wood carving and wooden toy industry, utilizing local forest produce?
(A) Varanasi
(B) Kanpur
(C) Agra
(D) Jhansi

63. Arrange the following districts of Uttar Pradesh from North to South based on their geographical location:
1. Saharanpur
2. Sonbhadra
3. Pilibhit
4. Mirzapur
Select the correct sequence:
(A) 1 - 3 - 4 - 2
(B) 3 - 1 - 2 - 4
(C) 1 - 4 - 3 - 2
(D) 3 - 2 - 1 - 4

64. Saharanpur in Uttar Pradesh is renowned for an industry largely dependent on forest produce. Which industry is this?
(A) Large-scale bidi leaf processing and commercial manufacturing
(B) Industrial matchbox splint production and packaging safety matches
(C) Paper and paperboard making from Baib

dwellers
(B) The State Forest Department exclusively
(C) The Ministry of Environment, Forest and Climate Change
(D) Private contractors who win the state auction

48. Does the definition of Minor Forest Produce (MFP) under the Forest Rights Act, 2006 include bamboo and cane?
(A) No, they are strictly classified as major timber produce.
(B) Yes, they are explicitly included as MFP under the Act.
(C) Bamboo is included, but cane is excluded.
(D) Only bamboo grown on private land is included.

49. Match List I with List II and select the correct answer using the options given below.
List I: Provision of FRA 2006
P. Section 3(1)(c)
Q. Gram Sabha
R. Right of Ownership
S. Community Forest Resource
List II: Description
1. Authority to determine the nature and extent of individual or community forest rights
2. Customary common forest land protected by communities
3. Right to collect, use, and dispose of minor forest produce
4. Ensures collectors can legally sell the MFP they gather
(A) P-3, Q-1, R-4, S-2
(B) P-1, Q-3, R-2, S-4
(C) P-4, Q-2, R-1, S-3
(D) P-3, Q-4, R-1, S-2

50. What is a primary challenge in realizing the MFP rights granted under the Forest Rights Act, 2006?
(A) The widespread lack of commercial market demand for any harvested non-timber forest produce items
(B) The situation where tribal populations completely refuse to engage in collecting forest produce
(C) The total and complete statutory absence of any state or national legislative laws governing forests
(D) Jurisdictional conflict over transit passes between Gram Sabhas and Forest Departments

51. The problem of illegal felling and smuggling of forest produce is particularly severe for high-value timber. Which of the following species is notorious for being smuggled out of the Seshachalam hills in southern India?
(A) Red Sanders (Rakta Chandan)
(B) Sal
(C) Teak
(D) Chir Pine

52. Which of the following control measures is legally employed by Forest Departments to monitor the movement of forest produce and prevent smuggling?
(A) Mandatory passport checks at forest borders
(B) Issuance of Transit Passes (TP)
(C) Use of foreign mercenaries
(D) Complete ban on all vehicles in the state

53. To curb illegal felling, technological interventions are increasingly used. Which of the following technologies is most relevant for large-scale monitoring of forest cover changes and illegal logging?
(A) Wildlife DNA sequencing and genetic population profiling
(B) Blockchain-based cryptocurrency ledger track systems
(C) Geographic Information Systems and Satellite Imagery
(D) Underground acoustic soil sensors and seismic detectors

54. Identify the incorrect statement regarding the control of illegal forest produce trade.
(A) The Indian Forest Act, 1927, empowers forest officers to seize property used in committing a forest offence.
(B) Smuggling of timber causes significant loss of state revenue.
(C) Joint Forest Management (JFM) committees often play a role in reporting illegal felling at the village level.
(D) The Wildlife Crime Control Bureau has no mandate to monitor illegal timber trade; it only looks after animals.

55. Forest-produce-based activities have massive employment generation potential. Which sector among the following absorbs the maximum number of seasonal workers in the NTFP economy?

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host trees
(B) Through the systematic tapping of outer bark of the Sal tree
(C) By mechanical crushing of ripe seeds of the Kusum tree
(D) By boiling harvested root systems of the native Palas tree

21. Consider the following statements regarding the collection of major forest products:
I. Gum Karaya is obtained from the Sterculia urens tree and has high export value.
II. Resin is exclusively tapped during the winter season to maximize yield.
III. Palas and Kusum trees are the primary host plants for lac insects.
Which of the above statements is/are correct?
(A) I and II only
(B) I and III only
(C) II and III only
(D) I, II and III

22. In the context of resin tapping from pine trees, the traditional "cup and lip" method has largely been replaced by which modern method to minimize damage to the tree?
(A) Rill method
(B) Girdling method
(C) Deep incision method
(D) Coppicing method

23. Bamboo is highly valued for its fast growth and versatility. Botanically, what is bamboo classified as?
(A) A soft-wood tree
(B) A perennial shrub
(C) A climbing vine
(D) A giant grass

24. Which of the following represents the most appropriate ecological benefit of promoting bamboo production in degraded forest lands?
(A) It permanently prevents all growth and establishment of any competitive floral species.
(B) Its rhizome network controls soil erosion and recharges local water tables.
(C) It acts as the primary dietary food source for large carnivorous wildlife populations.
(D) It rapidly depletes soil nitrogen, effectively stopping invasive weed propagation.

25. Cane (Rattan) thrives primarily in which type of forest ecosystem?
(A) Subtropical dry deciduous and open scrub forests
(B) Arid desert regions and sparse thorn scrub forests
(C) Tropical evergreen and moist deciduous forests
(D) High-altitude alpine pastures and meadow zones

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26. Which of the following operations is essential before cane can be used for manufacturing furniture and handicrafts to ensure it becomes pliable and insect-resistant?
(A) Chemical bleaching with high-concentration mineral acids
(B) High-temperature baking in a kiln at 500 degrees Celsius
(C) Continuous soaking in saline ocean water for six full months
(D) Seasoning and curing with kerosene oil or natural smoke

27. The livelihood of forest-dwelling communities is heavily tied to NTFP collection. According to national estimates, approximately what percentage of forest revenue and tribal income, respectively, is derived from NTFPs?
(A) About 5% of forest revenue, 10% of total tribal income
(B) About 20% of forest revenue, 40% of total tribal income
(C) 50% of forest revenue, up to 60% of tribal income
(D) About 90% of forest revenue, 90% of total tribal income

28. Arrange the following steps in the typical value chain of Minor Forest Produce from collection to final market:
1. Primary processing and sorting at village level
2. Procurement by state agencies or local aggregators
3. Collection by forest dwellers
4. Value addition and packaging at processing centres
Select the correct sequence:
(A) 3 - 2 - 1 - 4
(B) 3 - 1 - 2 - 4
(C) 1 - 3 - 2 - 4
(D) 2 - 3 - 1 - 4

29. Which state agency in Uttar Pradesh is primarily responsible for the organized collection, storage,

grass and bamboo
(D) Traditional lac bangle manufacturing and decorative handicrafts

65. The Vindhyan region of Uttar Pradesh, particularly Sonbhadra and Mirzapur, is a major source of which of the following forest produce?
(A) Deodar timber wood
(B) Sandalwood trees
(C) Pine resin and Biroja
(D) Tendu leaves and Lac

66. Which city in Uttar Pradesh is famously associated with the sports goods industry, utilizing specific types of wood like willow and mulberry?
(A) Meerut
(B) Aligarh
(C) Moradabad
(D) Bareilly

67. Bareilly in Uttar Pradesh is traditionally famous for furniture and artifacts made from which forest produce?
(A) Premium teak timber wood
(B) Aromatic sandalwood trees
(C) Bamboo and Cane products
(D) Polished walnut wood timber

68. The Kattha industry in Uttar Pradesh processes the heartwood of the Khair tree. Which regions in UP are primary sources for this tree?
(A) The arid zones of Bundelkhand
(B) The Gangetic floodplains
(C) The urban centers of NCR
(D) The Bhabar and Terai belts

69. Traditional knowledge associated with forest-based handicrafts is essential for sustaining rural livelihoods. Which state policy actively promotes such indigenous crafts under a "One District One Product" (ODOP) model?
(A) Uttar Pradesh
(B) Madhya Pradesh
(C) Bihar
(D) Rajasthan

70. Consider the following pairs under the Uttar Pradesh One District One Product (ODOP) scheme related to forest/wood-based products:
I. Saharanpur - Wood carving
II. Bijnor - Woodcraft
III. Chitrakoot - Wooden toys
IV. Pilibhit - Flute (Bansuri)
Which of the above pairs is/are correctly matched?
(A) I and IV only
(B) II and III only
(C) I, II and IV only
(D) I, II, III and IV

71. What is the role of Women's Self-Help Groups (SHGs) in the processing of forest produce under current rural livelihood schemes?
(A) They are restricted strictly to physical heavy labor such as carrying commercial timber logs.
(B) They perform grading, processing, and localized NTFP value addition.
(C) They act as armed enforcement guards to provide security for state forest protection.
(D) They manage high-level international commercial shipping logistics and trade contracts.

72. By forming SHGs for forest produce collection, rural women can avoid which common pitfall of the unorganized sector?
(A) Paying high corporate income taxes on micro-enterprise revenues
(B) Working long shifts inside air-conditioned industrial factories
(C) Earning fixed permanent government administrative salaries
(D) Distress selling to local moneylenders at throwaway prices

73. Which of the following best describes the prospect of developing eco-tourism based on forest produce?
(A) Allowing tourists to illegally harvest commercial timber logs as a fun recreational activity
(B) Converting natural dense forests into commercial concrete amusement parks and hotels
(C) Banning all local human communities so tourists can view completely pristine wild forests
(D) Establishing experiential eco-tourism focused on NTFP harvesting and tribal craft culture

74. How does integrating local forest produce into eco-tourism benefit the local ecology?
(A) It encourages locals to preserve forests as tourism depends on sustainable yields.
(B) It causes rapid widespread deforestation across forest zones to build large tourist

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CHAPTER 09
Forest Produce

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1. Under the Indian Forest Act, 1927, which of the following is defined as forest produce whether found in or brought from a forest or not?
(A) Peat, surface soil, rock and minerals
(B) Trees and leaves, flowers and fruits
(C) Timber, charcoal, caoutchouc, catechu and wood-oil
(D) Wild animals and skins

2. How is Non-Timber Forest Produce (NTFP) fundamentally distinguished from timber produce in commercial forestry?
(A) NTFPs are derived exclusively from the roots of forest trees
(B) NTFPs involve the extraction of biological materials other than wood used for structural purposes
(C) NTFPs are restricted to minor minerals and stones found in forest streams
(D) NTFPs consist solely of wildlife and animal derivatives

3. Which of the following best defines "Minor Forest Produce" (MFP) under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006?
(A) Only those forest products that have no commercial value
(B) Non-timber forest produce including both plant and animal origins
(C) Any timber harvested below a girth of 30 centimetres
(D) All non-timber forest produce of plant origin

4. Identify the incorrect statement regarding the classification of forest produce in India.
(A) Bamboos and canes are classified as Major Forest Produce under the Forest Rights Act.
(B) Commercial timber is generally categorized as Major Forest Produce across India.
(C) Tendu leaves are explicitly classified as Minor Forest Produce in statutory frameworks.
(D) Firewood is often considered a Major Forest Produce in traditional silviculture systems.

5. Which of the following types of timber is most prominently used in the manufacturing of railway sleepers and heavy construction due to its durability?
(A) Semal
(B) Khair
(C) Sal
(D) Mango

6. Consider the following statements regarding Teak (Tectona grandis):
Statement I: It is primarily found in the tropical evergreen forests of India.
Statement II: Its wood is highly valued for shipbuilding and premium furniture due to its resistance to termites.
Which of the statements given above is/are correct?
(A) Statement I only
(B) Statement II only
(C) Both Statement I and Statement II
(D) Neither Statement I nor Statement II

7. Consider the following statements regarding Non-Timber Forest Produce (NTFP):
Assertion (A): The economic importance of Non-Timber Forest Produce (NTFP) is crucial for the rural economy in tribal-dominated districts.
Reason (R): NTFPs provide cash income, food, and medicinal resources during lean agricultural seasons.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

8. In the match industry, the wood of which of the following trees is most commonly utilized due to its softness and easy splintering properties?
(A) Rosewood
(B) Semal
(C) Sal
(D) Mahua

84. Match List I with List II and select the correct answer using the options given below.

List I: Term Related to Forest Produce

P. Silviculture
Q. Usufructs
R. Value Addition
S. Sustainable Yield

List II: Meaning/Context

1. The right to enjoy the use and advantages of another's property (e.g., collecting NTFP)
2. Processing a raw product to increase its market price
3. The art and science of controlling the establishment, growth, and quality of forests
4. Harvesting equal to or less than the natural growth rate

(A) P-3, Q-1, R-2, S-4
(B) P-1, Q-2, R-3, S-4
(C) P-3, Q-2, R-1, S-4
(D) P-4, Q-1, R-2, S-3

85. In India, the National Working Plan Code provides guidelines for:
(A) Urban town planning and municipal infrastructure development
(B) Sustainable forest management and allowable harvest levels
(C) Financial budgeting for national agricultural fertilizer subsidies
(D) Highway network planning through protected national wildlife parks

86. Which category of forest produce includes items like honey, wax, and silk?
(A) Commercial major timber wood produce
(B) Wild edible plant vegetation produce
(C) Non-Timber Forest Produce of animal origin
(D) Heavy mineral and surface soil forest produce

87. Sal (Shorea robusta) seeds are collected primarily for which of the following commercial uses?
(A) Production of high-quality industrial writing and printing paper
(B) Manufacturing of lightweight safety matchbox splints and boxes
(C) Chemical synthesis of industrial artificial rubber compounds
(D) Extraction of sal seed butter for chocolate making and cosmetics

88. Mahua (Madhuca longifolia) is a culturally and economically vital tree for central Indian tribes. Which parts of the Mahua tree are collected as forest produce?
(A) Flowers and seeds
(B) Only the roots
(C) Only the heartwood for timber
(D) Leaves for bidi making

89. Which of the following is NOT an objective of providing a Minimum Support Price (MSP) for MFP?
(A) Ensuring fair and remunerative prices to gatherers
(B) Promoting sustainable harvesting practices
(C) Encouraging monopoly by private traders
(D) Enhancing tribal income and livelihood security

90. Which of the following states was a pioneer in implementing the nationalization of Tendu leaf trade in the 1960s?
(A) Punjab
(B) Madhya Pradesh
(C) Kerala
(D) Haryana

91. Consider the following statements regarding Bamboo:
I. It is legally considered a 'tree' outside forest areas as per the amended Indian Forest Act, 1927.
II. In 2017, the Indian Forest Act was amended to exempt bamboo grown in non-forest areas from the definition of a 'tree', easing its felling and transit.
III. The National Bamboo Mission aims to increase the area under bamboo cultivation.

Which of the above statements is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II and III

92. The extraction of 'Katha' from the Khair tree is done by which of the following processes?
(A) Boiling heartwood chips in water and crystallizing extract
(B) Tapping outer tree bark and collecting exuded sap continuously
(C) Crushing fresh green leaves and extracting natural plant juice
(D) Roasting harvested tree seeds over open high-temperature fires

93. A major non-timber forest produce in the Terai region of Uttar Pradesh is 'Baib' or 'Bhabar'

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(D) The produce is legally restricted to species growing inside designated National Parks

166. In the context of value addition, what process transforms raw bamboo into highly durable construction material or premium furniture?
(A) Bleaching and chemical/pressure treatment to prevent borer attacks
(B) Submerging raw culms continuously in plain fresh water for several years
(C) Coating outer culm walls with green paint immediately following harvest
(D) Mechanical crushing and grinding of raw culms into fine organic powder

167. Which of the following is a non-timber forest produce that serves as the base for chewing gum and is extracted by tapping the sap of the Sapodilla tree?
(A) Gutta-percha
(B) Chicle
(C) Karaya
(D) Tragacanth

168. Consider the following statements concerning Forest Certification:
I. It is a voluntary market-based mechanism.
II. It verifies that forests are managed according to stringent environmental and social standards.
III. It guarantees that the timber is sourced strictly from primary (virgin) forests.
IV. It helps combat illegal logging by ensuring a verifiable chain of custody.
Which of the above statements is/are correct?
(A) I, II and III only
(B) I, II and IV only
(C) II, III and IV only
(D) I, III and IV only

169. What is the overarching goal of integrating forest produce management with the rural economy as emphasized in contemporary Indian forest policies?
(A) To systematically relocate rural forest populations to major urban industrial manufacturing centers
(B) To achieve poverty alleviation for forest communities while maintaining ecological balance
(C) To commercialize and lease all public forest lands to multinational private corporations
(D) To completely eliminate all human presence and physical interaction within forest ecosystems

170. Which of the following best summarizes the 'interdependent relationship' between forest produce and the rural economy?
(A) The rural economy continuously exploits forest resources until total resource depletion occurs.
(B) Forests support rural livelihoods, while community action ensures forest preservation.
(C) The rural economy operates completely independently of forests owing to modern technologies.
(D) Natural forests rely on local rural communities solely for applying synthetic fertilizers.

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(A) Uttar Pradesh
(B) Jharkhand
(C) Kerala
(D) Himachal Pradesh

104. Shellac, derived from raw lac, is primarily used in which of the following industries?
(A) Heavy industrial metallurgy and smelting
(B) Varnish, polish, and food glazing
(C) Commercial paper manufacturing and pulping
(D) Portland cement production and processing

105. Select the correct sequence of steps involved in the production of finished Lac from host trees:
1. Harvesting lac encrusted branches (sticklac)
2. Inoculation of host trees with lac insects
3. Processing into shellac/button lac
4. Crushing and washing to produce seedlac

Select the correct sequence:
(A) 2 - 1 - 4 - 3
(B) 1 - 2 - 3 - 4
(C) 2 - 4 - 1 - 3
(D) 1 - 3 - 4 - 2

106. In the context of employment generation, why is the NTFP sector considered vital for gender equity in rural areas?
(A) Only men are permitted by law to collect NTFPs.
(B) Women constitute the majority of primary gatherers of NTFPs.
(C) NTFP collection requires heavy machinery operated only by trained male engineers.
(D) NTFP work involves migrating to urban areas, which men prefer.

107. Which of the following represents a major constraint in the marketing of minor forest produce by local communities?
(A) High perishability of NTFPs and lack of cold storage facilities
(B) Extreme overabundance of modern government godowns in every forest village
(C) Nationwide statutory ban on the commercial sale of all natural products in India
(D) Complete lack of natural vegetation and timber resources across Indian forests

108. The concept of 'Forest Certification' is gaining traction in India. Which Indian standard has been developed recently for forest management certification?
(A) International Quality Standard ISO 9001 certification
(B) National Working Plan Code (NWPC) guidelines framework
(C) National Forest Certification Scheme (NCCF)
(D) Bureau of Indian Standards (BIS) Environmental Standard 14000

109. What is the primary benefit of obtaining a 'Chain of Custody' certification for forest produce?
(A) It completely exempts commercial traders from paying any state or national income tax
(B) It tracks forest products from certified forests to end consumers.
(C) It chemically guarantees that the finished wood product is totally immune to natural decay
(D) It grants legal permission for unlimited unmonitored commercial extraction of the product

110. Which of the following NTFPs is extensively used as a natural dyeing agent for textiles and in culinary applications for color?
(A) Annatto seeds (Bixa orellana)
(B) Dried leaves of Neem (Azadirachta indica)
(C) Natural resin extracted from Sal trees
(D) Tender harvested shoots of wild Bamboo

111. Gum Arabic, a commercially important natural gum, is extracted from species of which tree?
(A) Acacia
(B) Ficus
(C) Mangifera
(D) Eucalyptus

112. Consider the following statements regarding the Forest Rights Act, 2006:
Assertion (A): The Forest Rights Act, 2006 has democratized the governance of minor forest produce.
Reason (R): It explicitly recognizes the rights of Gram Sabhas to manage and market MFPs independently of the Forest Department's monopoly.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

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grass (Eulaliopsis binata). What is its traditional primary use?
(A) Essential oil extraction
(B) Making ropes and paper pulp
(C) Human consumption as a cereal
(D) Extracting yellow dye

94. What is 'Coppicing' in the context of forest produce management?
(A) Complete physical uprooting of standing mature trees from forest soil
(B) Cutting trees near ground level to stimulate multi-stem regrowth
(C) Burning forest floor litter layer to temporarily increase soil fertility
(D) Applying synthetic chemical treatments to timber to prevent termite attacks

95. 'Pollarding' is another silvicultural technique related to forest produce. It involves:
(A) Cutting upper tree branches above animal browsing height
(B) Injecting synthetic growth chemicals into tree trunks to boost fruit yields
(C) Harvesting and processing underground root systems of wild medicinal plants
(D) Slicing lower tree trunks horizontally to systematically extract natural resin

96. Which of the following acts provides the overarching legal framework for the regulation of transit of forest produce in India?
(A) Environment (Protection) Act, 1986
(B) Indian Forest Act, 1927
(C) Biological Diversity Act, 2002
(D) Forest Rights Act, 2006

97. If a person is found illegally transporting high-value timber in Uttar Pradesh, under which legislation will the Forest Department primarily confiscate the vehicle and produce?
(A) Uttar Pradesh Zamindari Abolition and Land Reforms Act
(B) Indian Forest Act, 1927 (as amended in UP)
(C) Motor Vehicles Act, 1988 and state transit rules
(D) Wildlife (Protection) Act, 1972 and amendments

98. Consider the following statements regarding the Tribal Cooperative Marketing Development Federation (TRIFED):
I. It functions under the administrative control of the Ministry of Tribal Affairs.
II. It organizes 'Aadi Mahotsav' to exhibit and sell tribal art and forest produce.
III. It regulates the international price of commercial timber.
IV. It implements the Van Dhan Yojana at the grassroots level.
Which of the above statements is/are correct?
(A) I, II and III only
(B) I, II and IV only
(C) II, III and IV only
(D) I, III and IV only

99. The 'Sanjeevani' scheme or similar herbal marketing initiatives by state forest corporations primarily aim to:
(A) Distribute all harvested forest herbs completely free of cost to foreign countries
(B) Market standardized pure Ayurvedic formulations derived from forest produce
(C) Systematically eradicate wild medicinal plant species to raise teak plantations
(D) Fully privatize reserved public forest lands for commercial pharmaceutical companies

100. Which type of forest produce is 'Chironji' (Buchanania lanzan)?
(A) A commercial major timber species heavily used for building bridges and structures
(B) An invasive toxic weed species that degrades pasture lands and forest floors
(C) A highly valued edible seed dry fruit gathered by forest dwellers
(D) A specialized type of natural industrial rubber extracted through latex tapping

101. Out of the total forest cover in Uttar Pradesh, a significant portion lies in the Vindhyan region. Which of the following NTFPs is predominantly collected from this specific region rather than the Terai?
(A) Cane (Rattan)
(B) Sal timber
(C) Tendu leaves
(D) Pine resin

102. Identify the correct pair of a forest produce and its botanical source.
(A) Beedi leaf - Diospyros melanoxylon
(B) Katha - Pinus roxburghii species
(C) Resin - Shorea robusta tree bark
(D) Lac insect - Tectona grandis timber

103. Which state in India is the largest producer of Lac, an essential forest produce?

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122. Which of the following traditional practices among forest-dwelling communities can negatively impact the yield of NTFPs if not managed properly?
(A) Practicing strictly regulated rotational cattle grazing in protected forest fringe zones
(B) Setting uncontrolled annual forest fires to clear undergrowth for fruit gathering
(C) Systematic application of organic green manure to improve soil fertility in forest plots
(D) Adopting structured rotational harvesting schedules across distinct forest compartment units

123. Which institution in India is the apex body for research in forestry and forest products?
(A) Indian Council of Agricultural Research (ICAR) and allied institutes
(B) Indian Council of Forestry Research and Education (ICFRE)
(C) Wildlife Institute of India (WII) national conservation body
(D) Forest Survey of India (FSI) geospatial mapping organization

124. The Forest Research Institute (FRI), a premier institute dealing with research on forest produce, is located in:
(A) Bhopal
(B) Dehradun
(C) Lucknow
(D) Coimbatore

125. The scheme 'Minimum Support Price (MSP) for Minor Forest Produce' includes 'Myrobalan'. What is the common Indian name for Myrobalan?
(A) Harad / Baheda
(B) Neem tree foliage
(C) Aromatic Sandalwood
(D) Mahua tree flowers

126. Consider the following statements regarding the export of forest products from India:
I. India is a net importer of industrial roundwood and timber.
II. India is a significant exporter of NTFPs, particularly medicinal plants, gums, and essential oils.
III. The export of wild animal parts is heavily promoted to earn foreign exchange.
Which of the above statements is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II and III

127. Which of the following is an example of an essential oil extracted from forest produce that has high commercial and export value?
(A) Cold-pressed mustard seed oil
(B) Sandalwood oil
(C) Refined groundnut seed oil
(D) Organic soybean vegetable oil

128. What does the term 'Transit Pass' (Ravanah/ TP) denote in the administration of forest produce?
(A) An entry ticket authorizing eco-tourists and visitors to access protected National Park areas
(B) A legal permit issued by the Forest Department for movement of produce
(C) A seasonal permit for grazing domestic livestock cattle inside protected wildlife sanctuaries
(D) A statutory quality certificate ensuring purity and authenticity for Ayurvedic medicines

129. If a local community wants to set up a small-scale industry based on processing Amla and Jamun collected from the forest, which state-level body typically supports such cottage industries financially and technically?
(A) Khadi and Village Industries Commission (KVIC) / State Boards
(B) Reserve Bank of India (RBI) central banking regulator
(C) National Green Tribunal (NGT) judicial environmental bench
(D) Securities and Exchange Board of India (SEBI) financial regulator

130. The livelihood dependency of tribal populations on forests is highest during which period of the year?
(A) The post-harvest winter season when major agricultural crop trading takes place
(B) The peak monsoon rainy season when farming and sowing activities reach their maximum
(C) Lean agricultural months (summer and pre-monsoon) when food stocks are low
(D) Major urban festival seasons when demand for consumer goods increases sharply

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131. Which of the following forest produce is widely used in the incense stick (Agarbatti) industry, serving as a binding agent?
(A) Fine fragrant sandalwood wood powder
(B) Jiggit powder (bark of Machilus macrantha)
(C) Processed tendu leaf wrapper powder
(D) Dried and ground young bamboo shoots

132. Which of the following statements is correct regarding 'Kusmi' and 'Rangeeni'?
(A) They are recognized indigenous tribal communities residing in northern regions of Uttar Pradesh.
(B) They are two Lac insect strains producing different lac qualities based on host tree and season.
(C) They are high-value commercial timber wood species harvested across the Western Ghats range.
(D) They are distinct floral varieties of organic wild honey harvested within the Terai forest region.

133. Consider the following statements regarding the forest produce of Uttar Pradesh:
I. The Terai region is abundant in Sal timber and Baib grass.
II. The Vindhyan region produces Tendu leaves and Bamboo.
III. Sandalwood is heavily cultivated and forms the primary forest revenue of UP.
IV. Resin tapping is a major activity in the pine forests of the Shivalik and adjoining hill regions.
Which of the above statements is/are correct?
(A) I, II and IV only
(B) I, II and III only
(C) II, III and IV only
(D) I, III and IV only

134. Identify the incorrect pair regarding forest-based products and their traditional production centers in Uttar Pradesh:
(A) Safety match manufacturing - Bareilly district
(B) Commercial paper and pulp production - Saharanpur
(C) Bidi rolling and tendu trade - Mirzapur and Sonbhadra
(D) Kattha extraction - Mathura

135. Which of the following interventions can maximize the income generation of a tribal gatherer of Mahua flowers?
(A) Selling fresh wet flowers directly to local private trader middlemen at the end of every collection day
(B) Solar drying, storage, and processing into energy bars or squashes
(C) Leaving harvested flowers undisturbed on the forest ground floor to decompose naturally into green manure
(D) Boiling gathered flowers immediately into alcohol beverages and consuming them locally within the village

136. What role does the Uttar Pradesh Forest Corporation (UPFC) play in the context of forest produce?
(A) It handles law enforcement police functions for wildlife and habitat protection across state reserves.
(B) It handles timber and NTFP harvesting, transport, and auctions to eliminate middlemen.
(C) It maps and monitors changing forest cover across all Indian states using remote sensing satellites.
(D) It formulates overall environmental protection legislation and statutory regulatory acts for the state.

137. Which of the following forms the basis of the 'Paper and Pulp' industry?
(A) Cellulose fibers obtained from wood and bamboo
(B) Natural resins and gums extracted from broad-leaved deciduous trees
(C) Concentrated chemical tannins extracted from outer tree bark layers
(D) Bioactive organic alkaloids isolated from wild medicinal plant species

138. Tannin, a chemical substance extracted from certain barks and fruits (like Harad, Babul, and Wattle), is extensively used in which industry?
(A) Leather tanning industry
(B) Steel manufacturing
(C) Petrochemical refining
(D) Electronics manufacturing

139. Which of the following is a primary objective of introducing a 'Minimum Support Price' (MSP) for specific forest products?
(A) To maximize the profit margins and commercial revenues of private industrial buyers
(B) To provide a price safety net for primary

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gatherers against market fluctuations
(C) To artificially raise retail market prices of final consumer goods in urban retail centers
(D) To impose a total legal ban on commercial trading of these forest products nationwide

140. Arrange the following value-addition processes for medicinal herbs in the correct order:
1. Packaging into retail units
2. Primary collection and cleaning from the forest
3. Extraction of active ingredients/powdering
4. Solar drying and grading

Select the correct sequence:
(A) 2 - 4 - 3 - 1
(B) 2 - 3 - 4 - 1
(C) 4 - 2 - 3 - 1
(D) 2 - 4 - 1 - 3

141. The illegal trade in forest produce often relies on forging 'Transit Passes' (TP). To counter this, many State Forest Departments have introduced:
(A) Imposing a total and complete statutory ban on all inter-state timber movement
(B) Implementing a digital National Transit Pass System for verifiable produce movement
(C) Mandating that all transport of harvested commercial timber must occur via airways
(D) Completely privatizing state border check-posts and assigning them to private firms

142. How does the illegal felling of trees directly impact the availability of Non-Timber Forest Produce (NTFP)?
(A) It increases overall NTFP yields by removing dense tree canopy layers to allow sunlight
(B) It destroys host trees, drastically reducing available seeds, fruits, leaves, and resins
(C) It exerts no measurable impact on NTFPs as they grow completely independently of timber trees
(D) It actively encourages commercial artificial chemical synthesis of NTFPs in industrial labs

143. Which law restricts the unauthorized gathering of forest produce from a National Park or Wildlife Sanctuary?
(A) Indian Forest Act, 1927
(B) Wildlife (Protection) Act, 1972
(C) Environment (Protection) Act, 1986
(D) Both (A) and (B)

NODIA

144. The Forest Rights Act, 2006, provides the right to collect minor forest produce from which categories of forests?
(A) Exclusively from unclassed municipal or village forest lands
(B) From all forest lands including reserved and protected forests or sanctuaries
(C) Exclusively from social forestry plantations established along roadsides
(D) Exclusively from privately owned agricultural forest land plots

145. What is the main ecological concern associated with the over-harvesting of 'Salai' (Boswellia serrata) trees for gum/resin (frankincense)?
(A) It rapidly accelerates the growth and spread of invasive alien floral species in forests
(B) Over-tapping depletes tree vitality, impairs regeneration, and eventually kills the tree
(C) It causes host trees to synthesize toxic chemical compounds in their edible fruit crops
(D) It leads to an ecological overabundance of pure oxygen gas throughout the forest stand

146. Which of the following is an example of an 'Ecotourism' activity that sustainably leverages forest produce?
(A) Commercial resort operations offering unlimited hunting and poaching of protected wild animals
(B) Community trails where tourists experience honey collection and buy local organic honey
(C) Luxury resort hotel developments constructed by clear-felling pristine coastal mangrove forests
(D) High-speed off-road jeep racing events organized through ecologically sensitive alpine meadows

147. Consider the following statements regarding small-scale forest-based enterprises:
Assertion (A): The promotion of small-scale forest-based enterprises can reduce rural-to-urban migration.
Reason (R): These enterprises create localized employment and income generation opportunities in remote forest-fringe villages.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

113. Under the Indian Forest Act, 1927, what is the legal presumption regarding the ownership of forest produce?
(A) All harvested forest produce legally belongs to whichever individual person finds it first
(B) All produce is presumed to belong to Government until proven otherwise.
(C) Legal ownership of all forest produce belongs exclusively to private corporate sectors
(D) Nobody holds legal ownership rights over any category of natural forest produce items

114. 'Van Dhan Vikas Kendras' established under the PMVDY primarily aim to perform which economic function?
(A) Provide low-interest personal consumer loans directly to unemployed rural tribal youth
(B) Procure, process, and value-add MFPs for better market price realization.
(C) Function as specialized law enforcement police stations within reserved forest areas
(D) Distribute fertile agricultural lands exclusively to landless forest dwelling families

115. The 'Panchayat (Extension to Scheduled Areas) Act, 1996' (PESA) grants ownership of minor forest produce to:
(A) Gram Sabhas in Scheduled Areas
(B) State Forest Development Corporations
(C) The Ministry of Environment, Forest and Climate Change
(D) Wildlife Wardens

116. Which of the following is considered a 'Major Forest Produce'?
(A) Honey
(B) Tendu leaves
(C) Teak timber
(D) Lac

117. What is the primary difference in the regulatory approach towards Major vs. Minor Forest Produce?
(A) Major produce is state-monopolized; minor rights are devolved to communities.
(B) Minor forest produce requires statutory clearance from Central Government agencies prior to any harvest.
(C) There is no legal or administrative difference between them as both are totally banned from extraction.
(D) Minor forest produce is heavily taxed during export while major timber produce is entirely tax-free.

118. Which non-timber forest produce, obtained from the wild, is a crucial ingredient in traditional Ayurvedic formulations like 'Triphala'?
(A) Harad, Baheda, and Amla
(B) Ashwagandha, Safed Musli, and Giloy
(C) Neem, Tulsi, and Aloe Vera
(D) Brahmi, Shankhpushpi, and Jatamansi

119. Match List I with List II and select the correct answer using the options given below.
List I: Forest Produce
P. Wooden Toys
Q. Sports Goods
R. Paper & Pulp (Baib Grass)
S. Bidi Industry (Tendu)
List II: Associated Region/District
1. Meerut
2. Saharanpur
3. Varanasi / Chitrakoot
4. Mirzapur / Sonbhadra
(A) P-3, Q-1, R-2, S-4
(B) P-1, Q-2, R-3, S-4
(C) P-4, Q-3, R-2, S-1
(D) P-2, Q-4, R-1, S-3

120. Bamboo is often referred to as 'Poor Man's Timber'. From an ecological and economic perspective, which feature makes it highly sustainable?
(A) It relies heavily on continuous application of synthetic chemical fertilizers and pesticides.
(B) It requires a minimum period of 50 years of growth to mature sufficiently for timber harvesting.
(C) It is a regenerative grass harvested in 3-4 year cycles without replanting.
(D) It exclusively grows in severely eroded and highly degraded soil types across plain regions.

121. The term 'Silviculture' is deeply related to maximizing the yield of forest produce. It specifically deals with:
(A) Commercial rearing of silkworm insects specifically on cultivated mulberry tree leaves
(B) The science of growing and cultivating forest crops (trees)
(C) The industrial chemical processing and bleaching of raw wood pulp in manufacturing
(D) Extracting precious silver ore and other minor mineral deposits from deep forest soils

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indigenous peoples

157. Which type of forest certification traces the path of products from forests through the supply chain, verifying that certified material is identified or kept separated from non-certified material?
(A) Forest Management System Certification (FM)
(B) Chain of Custody Certification (CoC)
(C) Environmental Carbon Credit Certification
(D) Agricultural Phytosanitary Certification

158. The Indian standard for forest certification, NCCF, operates under the endorsement of which global certification network?
(A) FSC (Forest Stewardship Council) global forestry network
(B) PEFC (Programme for Endorsement of Forest Certification)
(C) ISO (International Organization for Standardization) standards
(D) CITES (Convention on International Trade in Endangered Species)

159. What economic advantage does 'Forest Certification' provide to the exporter of forest produce like wooden handicrafts?
(A) It grants commercial exporters complete diplomatic immunity from trade laws
(B) It guarantees that all export goods receive permanent zero export tax duties
(C) It gives access to premium markets demanding legally and sustainably sourced products
(D) It legally permits exporters to smuggle endangered timber species internationally

160. Which of the following statements best describes 'Sustainable Yield' in relation to timber extraction?
(A) Harvesting all mature standing trees in a forest stand within a single calendar year
(B) Timber harvested periodically without declining long-term forest productivity
(C) Extracting timber continuously until production costs exceed market selling prices
(D) Imposing a permanent and complete legal ban on any form of timber harvesting

161. Consider the following statements regarding the marketing of forest produce:
I. Lack of market intelligence and price information often forces tribal gatherers into distress sales.
II. State Forest Corporations auction nationalized NTFPs through e-tendering to ensure transparency.
III. TRIFED's 'Tribes India' platform is restricted only to the physical sale of products in Delhi.
Which of the above statements is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II and III

162. How does the 'Minimum Support Price (MSP) for MFP' scheme operate during a market crash?
(A) The government legally compels private commercial traders to buy at higher mandated rates
(B) State designated agencies step in to procure MFP at MSP, preventing gatherer loss
(C) The MSP scheme is immediately suspended nationwide until open market prices recover
(D) Gatherers receive direct financial compensation to stop collecting forest produce

163. The collection of which of the following minor forest produce requires specialized traditional skills to avoid fatal accidents?
(A) Freshly fallen Mahua flowers from ground
(B) Ripe fallen Sal seeds from forest floor
(C) Wild Honey from rock bees (Apis dorsata)
(D) Fresh green Tendu leaves for bidi making

164. What is the primary role of a 'Transit Pass' in controlling the smuggling of forest produce?
(A) It serves as an official tax receipt issued for customs duties paid at international borders
(B) It proves legal origin and authorizes produce transport across forest check-posts
(C) It functions as a formal quality assurance certificate for commercial timber grades
(D) It acts as a mandatory commercial insurance document for the transport vehicle

NODIA

165. The term 'Nationalized Forest Produce' implies that:
(A) The produce can strictly be consumed by authorized government administrative officials
(B) State holds a monopoly over trade to regulate revenue and protect gatherers
(C) The produce is totally banned for domestic consumption and must be exported abroad

148. Which among the following is a non-destructive method of harvesting bark for medicinal purposes (e.g., Arjuna bark)?
(A) Removing bark in longitudinal strips from one side to let cambium heal
(B) Complete ring-barking or girdling around the entire circumference of the trunk
(C) Felling the entire mature tree to scrape off all outer bark from the timber
(D) Setting controlled fires at the base of the trunk to peel bark effortlessly

149. Why is the 'Agroforestry' model encouraged as a means to increase forest produce productivity?
(A) It completely eliminates any further ecological or economic need for natural wild forests
(B) It integrates trees into farm lands to boost yields and diversify farmer income
(C) It converts protected state forest lands into intensive chemical industrial farming zones
(D) It focuses exclusively on cultivating commercial genetically modified monoculture timber

150. In Uttar Pradesh, the 'Social Forestry' scheme historically aimed to:
(A) Establish commercial timber plantations within core critical tiger habitats
(B) Plant trees on commons and roadsides to meet rural fuelwood and fodder needs
(C) Privatize reserved state forests for large-scale corporate mineral mining
(D) Relocate all rural forest fringe villages permanently outside state borders

151. Which of the following organizations under the Ministry of Tribal Affairs is specifically tasked with creating a digital platform for the marketing of tribal forest produce?
(A) National Informatics Centre
(B) TRIFED
(C) FCI (Food Corporation of India)
(D) NAFED

152. Consider the economic relationship between a forest and the rural economy. What role does 'Leaf Litter' collected from the forest floor play?
(A) It is harvested and exported globally as a high-value industrial synthetic chemical agent
(B) It serves as organic manure in surrounding farm fields to maintain soil fertility
(C) It serves as the primary essential raw material for safety matchstick manufacturing
(D) It possesses zero economic value and functions strictly as a dangerous forest fire hazard

153. A significant portion of the rural energy needs in India is met by which forest produce?
(A) Coal mined from forest lands
(B) Fuelwood (firewood)
(C) Pine resin
(D) Mahua seed oil

154. Match List I with List II and select the correct answer using the options given below.
List I: Value Added Forest Product
P. Turpentine Oil
Q. Katha
R. Bidi
S. Silk
List II: Source Raw Material
1. Tendu leaves
2. Resin from Pine
3. Heartwood of Khair
4. Cocoons reared on host trees like Arjuna/ Asan
(A) P-2, Q-3, R-1, S-4
(B) P-3, Q-2, R-1, S-4
(C) P-2, Q-1, R-3, S-4
(D) P-1, Q-3, R-2, S-4

155. 'Van Dhan Vikas Kendras' heavily emphasize 'economies of scale'. How do they achieve this for individual tribal gatherers?
(A) By legally forcing all individual gatherers to work in centralized industrial factories
(B) By aggregating individual collections to negotiate bulk prices and processing equipment
(C) By imposing a statutory ban on small-scale individual collection across all forest areas
(D) By importing cheap synthetic NTFP substitutes from neighboring foreign countries

156. The 'Forest Certification' process evaluates a forest enterprise against a set of standards. Which of the following is NOT typically a standard evaluated during certification?
(A) Compliance with national environmental laws
(B) Protection of biodiversity and endangered species
(C) The political affiliation of the forest workers
(D) Respect for the traditional rights of

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ANSWERS

1. (C) Timber, charcoal, caoutchouc, catechu and wood-oil
Under Section 2(4) of the Indian Forest Act of 1927, forest produce is categorized based on origin and location. Specific products including timber, charcoal, caoutchouc, catechu, and wood-oil are statutorily classified as forest produce regardless of whether they are harvested within a designated forest or brought from an outside area into the jurisdiction.

2. (B) NTFPs involve the extraction of biological materials other than wood used for structural purposes
Non-Timber Forest Produce comprises all biological materials harvested from forests other than timber used for structural construction or heavy wood manufacturing. These resources include fruits, seeds, leaves, resins, gums, medicinal plants, and fibers. This functional distinction separates non-wood renewable forest products from traditional commercial timber logging in economic forestry practices.

3. (D) All non-timber forest produce of plant origin
Under Section 2(i) of the Scheduled Tribes and Other Traditional Forest Dwellers Act of 2006, Minor Forest Produce encompasses all non-timber forest produce of plant origin. This legal definition explicitly includes bamboo, brushwood, stumps, canes, tussar, cocoons, honey, wax, lac, tendu leaves, medicinal plants, roots, and tubers extracted by dwellers.

4. (A) Bamboos and canes are classified as Major Forest Produce under the Forest Rights Act.
The Scheduled Tribes and Other Traditional Forest Dwellers Act of 2006 explicitly categorizes bamboo and cane as Minor Forest Produce rather than Major Forest Produce. This statutory classification grants forest-dwelling communities ownership and collection rights, distinguishing them from major commercial timber items like teak, sal, and rosewood across forest management.

5. (C) Sal
Sal timber is renowned for its exceptional durability, strength, and resistance to wood-boring insects. These natural physical attributes make it the primary choice for heavy construction applications, structural framing, and railway sleeper manufacturing. Its dense grain structure prevents warping and degradation under extreme atmospheric conditions and heavy mechanical loads.

6. (B) Statement II only
Teak is predominantly found in tropical moist and dry deciduous forests across central and southern India, rather than tropical evergreen forests. Its high resin content, natural durability, and termite resistance make it exceptionally valuable for shipbuilding, outdoor construction, and high-grade furniture manufacturing, confirming the truth of the second description.

7. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Non-Timber Forest Produce forms the primary source of cash income, food security, and medicinal remedies for rural tribal households, particularly during lean agricultural seasons. Because these seasonal forest resources directly buffer agricultural shortfalls and supply daily essential needs, their economic role is indispensable for sustaining rural economies in tribal-dominated districts.

8. (B) Semal
Semal wood is characterized by its lightweight, soft texture, and straight grain, which allows easy splitting without splintering uncontrollably. These physical properties make it ideal for matchstick manufacturing, box packing, and veneer production. Hardwoods like sal and rosewood are unsuitable for match splints due to their high density and hardness.

9. (C) Extraction of Kattha for human consumption and leather dyeing
The heartwood of Acacia catechu, commonly known as Khair, is industrially processed through water boiling to extract Kattha and Cutch. Kattha is widely used in pan preparations and traditional pharmaceuticals, while Cutch serves as a natural tanning agent in leather processing

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95. (A) Cutting upper tree branches above animal browsing height
Pollarding is a silvicultural practice that involves cutting back the upper branches of a tree above ground level to promote dense crown regrowth. Performing the cut above head height prevents browsing livestock and wild herbivores from reaching young shoots, securing fodder and small wood supplies.

96. (B) Indian Forest Act, 1927
Chapter VII of the Indian Forest Act of 1927 grants state governments legal authority to formulate rules regulating the transit of timber and other forest produce. It provides the overarching framework for establishing check-posts, requiring official transit passes, and penalizing unauthorized movement of forest resources.

97. (B) Indian Forest Act, 1927 (as amended in UP)
Illegal transportation of timber in Uttar Pradesh is prosecuted under the Indian Forest Act of 1927 as amended by state legislation. Section 52 empowers forest and police officers to seize illicit timber, tools, and transport vehicles, subjecting them to state confiscation proceedings.

98. (B) I, II and IV only
TRIFED operates under the Ministry of Tribal Affairs, organizes national Aadi Mahotsav exhibitions, and implements the Van Dhan scheme. Regulating international timber prices lies outside its statutory authority, making the third statement incorrect as timber pricing is governed by global commodity market forces.

99. (B) Market standardized pure Ayurvedic formulations derived from forest produce
Initiatives like Sanjeevani, managed by state forest development corporations, focus on processing, standardizing, and marketing authentic Ayurvedic medicines, herbal teas, and cosmetics derived from sustainably harvested forest plants. These platforms ensure product purity, promote traditional healthcare, and return revenues to rural gathering communities.

100. (C) A highly valued edible seed dry fruit gathered by forest dwellers
Buchanania lanzan, commonly known as Chironji, is a tree native to dry deciduous forests across central India. The tree yields high-value edible seeds that are gathered by forest dwellers, processed to remove outer shells, and sold as a premium dry fruit and baking ingredient.

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101. (C) Tendu leaves
The Vindhyan region of Uttar Pradesh features dry deciduous vegetation dominated by species like Diospyros melanoxylon. This environment supports extensive seasonal Tendu leaf collection, whereas moisture-dependent resources like cane and dense sal timber plantations are predominantly situated in the humid northern Terai belt.

102. (A) Beedi leaf - Diospyros melanoxylon
Diospyros melanoxylon is the botanical name for the Tendu tree, whose leaves are harvested for bidi rolling. Katha is derived from Acacia catechu, resin is tapped from Pinus roxburghii, and lac is produced by Kerria lacca insects, making the first pair the only accurate match.

103. (B) Jharkhand
Jharkhand is the leading producer of natural lac in India, accounting for the largest share of national production. The state's tropical deciduous forests offer abundant host tree populations, such as Kusum, Palas, and Ber, supporting extensive rural lac cultivation and sticklac harvesting.

104. (B) Varnish, polish, and food glazing
Shellac is a natural bio-resin refined from sticklac. Due to its excellent film-forming properties, high gloss, and non-toxic nature, it is widely used in wood varnishes, electrical insulation coatings, printing inks, pharmaceutical pill coatings, and food glazing agents across international manufacturing sectors.

105. (A) 2 - 1 - 4 - 3
Lac production begins with inoculating host trees with brood lac insects. After feeding and resin secretion, lac-encrusted branches are harvested as sticklac. The harvested material is crushed and washed to remove insect debris and dye, yielding seedlac, which is subsequently heat-refined into commercial shellac or button lac.

106. (B) Women constitute the majority of primary gatherers of NTFPs.
Women form the overwhelming majority of primary gatherers and primary processors in the non-timber forest produce sector. Because NTFP collection and primary processing can be integrated with domestic schedules, this sector

Ber. The tiny insects feed on tree sap and secrete a protective resinous encrustation around twigs, which is harvested as sticklac and refined into commercial shellac.

21. (B) I and III only
Gum Karaya is harvested from Sterculia urens trees and holds significant commercial export value in pharmaceuticals and food. Palas and Kusum serve as primary host trees for lac insect cultivation. Resin tapping is carried out during warm seasons when sap flow is high, making the second statement incorrect.

22. (A) Rill method
The traditional cup and lip method for pine resin tapping caused deep structural incisions that weakened tree trunks and increased wind-throw susceptibility. The modern rill method uses shallow surface channels combined with chemical stimulants, ensuring steady resin yield while minimizing physical damage and preserving long-term tree health.

23. (D) A giant grass
Botanically, bamboo belongs to the grass family Poaceae and is classified as a perennial giant woody grass rather than a true tree species. It features hollow jointed stems, rapid vegetative growth cycles, and extensive rhizome root systems, allowing it to regenerate rapidly after periodic harvesting without requiring replanting.

24. (B) Its rhizome network controls soil erosion and recharges local water tables.
Bamboo features an extensive interconnected underground rhizome and fibrous root network that binds topsoil tightly, preventing water runoff and erosion on slope lands. This root architecture enhances rainwater infiltration into subsurface aquifers, promoting hydrological restoration and soil conservation across degraded and fragile forest ecosystems.

25. (C) Tropical evergreen and moist deciduous forests
Canes, or rattans, are climbing palms that require high humidity, consistent rainfall, and dense canopy cover to thrive. Consequently, they are predominantly distributed in tropical evergreen, semi-evergreen, and moist deciduous forest ecosystems, such as those found in the Western Ghats, Eastern Himalayas, and Andaman Islands.

26. (D) Seasoning and curing with kerosene oil or natural smoke
Raw harvested cane contains natural moisture and starch, making it brittle and vulnerable to fungal decay and wood-boring insects. Subjecting harvested cane to seasoning, heat treatment, and chemical curing using kerosene oil or natural smoke enhances flexibility, improves structural strength, and protects finished handicrafts from pest infestation.

27. (C) 50% of forest revenue, up to 60% of tribal income
Non-Timber Forest Produce contributes approximately 50% of total forest revenue generated across India and accounts for up to 60% of net cash income for forest-dwelling tribal communities. These non-wood products provide critical economic sustenance, particularly during non-agricultural seasons when alternative employment opportunities are scarce.

28. (B) 3 - 1 - 2 - 4
The standard value chain begins with manual collection of produce by forest dwellers, followed by primary cleaning, drying, and sorting at the village level. Local aggregators or state agencies then procure the sorted produce, which is transported to processing units for final value addition, refinement, and commercial packaging.

29. (B) Uttar Pradesh Forest Corporation (UPFC)
The Uttar Pradesh Forest Corporation is the statutory state agency mandated to oversee the organized harvest, collection, storage, and commercial marketing of nationalized forest produce such as Tendu leaves and timber. UPFC operates to streamline trade operations, regulate market pricing, and safeguard primary gatherers from private exploitation.

30. (A) To eliminate middlemen and ensure fair wages to collectors
State governments nationalized high-value minor forest produce like Tendu leaves to break the monopoly of private contractors and intermediaries. By establishing state-monopolized collection channels, governments could enforce minimum collection wages, ensure direct timely payments to tribal gatherers, and retain revenue surpluses for local community development.

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31. (C) To improve tribal incomes through value addition of forest produce
The Pradhan Mantri Van Dhan Yojana aims to enhance tribal livelihoods by transforming primary gatherers into forest-based entrepreneurs. The scheme establishes community-based processing centers to promote localized drying, grading, packaging, and branding of minor forest produce, thereby capturing higher market value for primary tribal collectors.

32. (C) around 300
A standard Van Dhan Vikas Kendra aggregate unit is formed by combining approximately 15 tribal Self Help Groups, each consisting of 20 gatherers. This brings the total strength of a fully functional center to around 300 primary gatherers, creating necessary economies of scale for collective processing and marketing.

33. (D) TRIFED
The Tribal Cooperative Marketing Development Federation of India operates as the national nodal implementation agency for the Van Dhan Yojana. Operating under the Ministry of Tribal Affairs, TRIFED oversees funding distribution, training programs, technological support, and retail market integration for Van Dhan Vikas Kendras nationwide.

34. (B) Formation of Self Help Groups for collective processing and marketing
The scheme organizes individual tribal gatherers into localized Self Help Groups, which are further aggregated into processing centers. This structural framework provides collective machinery, technical training, and institutional credit, enabling gatherers to undertake primary processing, grading, and direct commercial marketing without relying on exploitative middlemen.

35. (B) I, III and IV only
The Minimum Support Price for Minor Forest Produce scheme provides price safety for forest gatherers, with TRIFED recommending baseline prices to the Ministry and state agencies executing procurement when market prices collapse. The scheme excludes agricultural crops grown on forest lands, making the second statement inaccurate.

36. (D) Forest-dwelling Scheduled Tribes and traditional forest dwellers
The MSP for MFP scheme is specifically targeted toward empowering Scheduled Tribes and traditional forest dwellers who rely on collecting non-timber forest produce for daily sustenance. The program provides a guaranteed price floor, shielding vulnerable gatherers from sudden market price slumps and exploitative trader rings.

37. (A) Commercial Teak logs
The Minimum Support Price for MFP scheme exclusively covers non-timber forest produce items like tamarind, mahua seeds, sal seeds, and tendu leaves. Commercial timber logs, such as teak and sal timber, are classified as Major Forest Produce and are excluded from this social safety net mechanism.

NODIA

38. (B) Limited access to modern processing technology and institutional credit
Small-scale forest enterprises face major structural constraints, including inadequate access to modern processing equipment, insufficient working capital, and restricted institutional credit. These technical and financial bottlenecks prevent primary gatherers from processing raw materials efficiently, leading to reduced product shelf life and lower profit margins.

39. (C) Paan (betel) preparation and natural dyeing
Kattha is a core ingredient in traditional betel leaf (paan) preparations due to its astringent properties and rich color. Cutch, a co-product of Khair wood processing, is heavily utilized in leather tanning, textile printing, and natural dyeing industries, supporting specialized small-scale commercial operations.

40. (D) Madhya Pradesh
Madhya Pradesh is the largest producer of Tendu leaves in India, contributing a massive share to the national output. The state's extensive dry deciduous forest reserves host abundant Diospyros melanoxylon populations, supporting millions of rural gatherers who supply the raw material needed for bidi production.

41. (B) Tribal Cooperative Marketing Development Federation of India Limited
TRIFED stands for Tribal Cooperative Marketing Development Federation of India Limited. Established in 1987 under the Multi-

State Cooperative Societies Act, it operates under the administrative control of the Ministry of Tribal Affairs to promote socio-economic development of tribal populations through organized marketing of forest produce.

42. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
TRIFED establishes "Tribes India" retail outlets and digital platforms to market authentic tribal handicrafts and minor forest produce directly to consumers. By eliminating private intermediaries from the supply chain, direct retail channels ensure that the maximum financial margin is transferred to primary tribal artisans and gatherers.

43. (D) Tech For Tribals
The Tech For Tribals initiative was launched by TRIFED to impart entrepreneurship and technology skills to tribal gatherers under the Van Dhan scheme. The program focuses on digitizing operations, improving enterprise management, and connecting rural processing units directly with modern electronic supply chains and urban markets.

44. (A) Harvesting rate must not exceed natural regeneration rate of species.
Sustainable forest harvesting dictates that the extraction rate of any biological resource must remain at or below the natural regeneration capacity of the target species population. Adhering to this principle ensures long-term population survival, maintains biodiversity, and prevents ecological degradation while supporting continuous economic yields.

45. (B) Mandated time gap between successive harvests in an area for regeneration
The rest period or felling cycle is the planned temporal interval between consecutive harvesting operations in a specific forest block. This scheduled gap allows harvested plant populations to recover, disperse seeds, and regenerate lost biomass naturally, preserving forest health and ensuring long-term resource availability.

46. (D) Lopping off entire branches of Amla trees to collect fruits easily
Severing whole branches to harvest fruits destroys tree canopy architecture, inhibits future flowering, and increases vulnerability to disease and insect damage. Such destructive harvesting practices compromise long-term fruit yields, whereas non-destructive methods, such as picking mature fruits or gathering fallen produce, support sustainable plant growth.

47. (A) The Gram Sabha and the recognized forest dwellers
Section 3(1)(c) of the Forest Rights Act of 2006 vests ownership, access, collection, use, and disposal rights over minor forest produce in recognized forest-dwelling Scheduled Tribes and traditional forest dwellers through their respective Gram Sabhas, ending the historical monopoly held by state forest departments.

48. (B) Yes, they are explicitly included as MFP under the Act.
The Forest Rights Act of 2006 explicitly incorporates bamboo and cane within its legal definition of Minor Forest Produce. This statutory inclusion grants forest-dwelling communities community rights to collect, manage, process, and sell bamboo and cane harvested within their traditional forest boundaries without department restrictions.

49. (A) P-3, Q-1, R-4, S-2
Section 3(1)(c) grants minor forest produce rights; the Gram Sabha serves as the statutory authority determining rights; ownership ensures local gatherers can legally sell produce; and Community Forest Resource areas represent customary common forest lands protected and managed by local village communities.

50. (D) Jurisdictional conflict over transit passes between Gram Sabhas and Forest Departments
A primary challenge in implementing the Forest Rights Act is the administrative conflict between Gram Sabhas and state forest departments over issuing Transit Passes. While Gram Sabhas possess legal authority to manage minor forest produce, state officials frequently demand departmental permits, creating logistical bottlenecks for tribal gatherers.

51. (A) Red Sanders (Rakta Chandan)
Pterocarpus santalinus, commonly known as Red Sanders or Rakta Chandan, is an endemic timber tree species highly concentrated in the Seshachalam Hill ranges of Andhra Pradesh. Due to its immense commercial demand in international markets for furniture and cosmetics, it is subject to severe illegal smuggling.

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52. (B) Issuance of Transit Passes (TP)
State forest departments utilize Transit Passes as a mandatory legal control mechanism to monitor the transportation of timber and minor forest produce. Transporting forest produce without a valid transit pass constitutes a statutory offence, enabling authorities to verify timber provenance and prevent illegal logging and smuggling.

53. (C) Geographic Information Systems and Satellite Imagery
Geographic Information Systems combined with satellite remote sensing enable large-scale monitoring of forest canopy changes over time. Forest authorities utilize multi-spectral imagery to detect unauthorized tree felling, monitor canopy density loss, track illegal roads inside reserves, and direct targeted enforcement operations against illegal logging networks.

54. (D) The Wildlife Crime Control Bureau has no mandate to monitor illegal timber trade; it only looks after animals.
The Wildlife Crime Control Bureau is legally authorized under the Wildlife (Protection) Act to collect intelligence and coordinate enforcement operations regarding illegal trade in both wild fauna and flora, including protected timber species listed in CITES appendices, making the fourth statement incorrect.

55. (A) Tendu leaf collection and Bidi manufacturing
Tendu leaf plucking and bidi rolling absorb the highest volume of seasonal manual labor in India's non-timber forest produce economy. The labor-intensive nature of leaf collection during dry summer months provides essential wage employment to millions of rural tribal women and landless agricultural workers across central Indian states.

56. (B) I and III only
Bamboo harvesting provides steady year-round employment, and ecotourism diversifies local livelihoods, reducing pressure on forest extraction. The second statement is incorrect because women constitute the overwhelming majority of primary NTFP gatherers, performing harvesting, drying, and primary sorting operations across rural areas.

NODIA

57. (C) Processing raw amla into marketable candies and juices before selling
Value addition involves transforming raw harvested produce into processed, higher-value consumer goods. Processing raw amla fruits into candies, juices, or dried powders extends product shelf life, enhances commercial quality, and allows local producers to capture higher financial returns compared to selling unprocessed raw fruits to middlemen.

58. (D) Higher profit margins for the primary gatherers
Performing localized processing, grading, and packaging of non-timber forest produce enhances overall product value and extends shelf life. This structural transition enables primary gatherers to sell refined products directly to secondary processors or consumers, capturing higher profit margins that previously went to commercial intermediaries.

59. (A) Lac, natural gums, resins, and medicinal plant extracts
India maintains a strong competitive presence in international trade for processed non-timber forest products. Product categories such as refined shellac, natural gums like Karaya and Guar, oleoresins, and standardized plant extracts experience strong export demand across international food, pharmaceutical, cosmetic, and industrial manufacturing sectors.

60. (B) Food, pharmaceutical, and cosmetic industries as a thickener
Gum Karaya, extracted from Sterculia urens trees, is a natural polysaccharide valued for its water-swelling and emulsifying properties. It is extensively utilized across international food processing, pharmaceutical binding, cosmetic formulation, and textile printing industries as a natural thickening agent, stabilizer, and dietary fiber source.

61. (D) It is strictly regulated or banned to conserve domestic forest resources.
To prevent ecological degradation and conserve domestic forest ecosystems, the Export-Import Policy of India strictly regulates or bans the export of unprocessed timber logs harvested from natural forests. Exports are generally restricted to value-added finished wood products, handicrafts, and timber grown under commercial plantation agroforestry systems.

62. (A) Varanasi
Varanasi in Uttar Pradesh possesses a rich historical tradition of wooden toy making and delicate wood carving. Local artisans utilize soft woods to craft intricate decorative items, traditional toys, and religious idols, forming a prominent forest-based handicraft cluster recognized under state development programs.

63. (A) 1 - 3 - 4 - 2
Saharanpur lies in the northernmost sub-Himalayan belt of Uttar Pradesh, followed by Pilibhit in the northern Terai region. Moving south across the Gangetic plain brings Mirzapur in the Vindhyan plateau, with Sonbhadra located at the southernmost tip of the state, establishing the correct geographical sequence.

64. (C) Paper and paperboard making from Baib grass and bamboo
Saharanpur is a major historical hub for the paper and paperboard industry in Uttar Pradesh. The industrial cluster originally developed due to nearby forest supplies of long-fiber raw materials like Baib grass and bamboo from the Shivalik and Terai belts, combined with abundant processing water resources.

65. (D) Tendu leaves and Lac
The dry deciduous forests of the Vindhyan plateau region, encompassing Sonbhadra and Mirzapur districts, host extensive populations of Diospyros melanoxylon and lac host trees. Consequently, this geographic belt serves as the primary regional source for Tendu leaf collection and natural lac cultivation in Uttar Pradesh.

66. (A) Meerut
Meerut is recognized nationally and internationally as a major manufacturing center for sports goods. The local industry relies heavily on specialized timber species, utilizing English and Kashmir willow for cricket bats and Mulberry wood for hockey sticks, supporting a specialized forest-resource-based industrial base.

67. (C) Bamboo and Cane products
Bareilly is historically renowned for its artisanal furniture industry specializing in bamboo and cane products. Local craftsmen manufacture durable chairs, tables, screens, and woven artifacts, utilizing raw cane and bamboo transported from the nearby Terai moist deciduous forests and neighboring sub-Himalayan forest tracts.

68. (D) The Bhabar and Terai belts
Acacia catechu grows abundantly in the sub-Himalayan Bhabar and Terai forest zones of northern Uttar Pradesh. The well-drained alluvial soils and riverine tracks of these regions provide ideal ecological conditions for Khair tree stands, supplying raw heartwood to regional Kattha processing centers.

69. (A) Uttar Pradesh
The Government of Uttar Pradesh launched the One District One Product scheme to promote traditional indigenous crafts and small industries. The policy targets specific regional wood and forest-based handicrafts, providing financial credit, technical upgrades, and marketing platforms for clusters like Saharanpur wood carving and Chitrakoot wooden toys.

70. (D) I, II, III and IV
Under the Uttar Pradesh ODOP program, Saharanpur is designated for wood carving, Bijnor for woodcraft products, Chitrakoot for traditional wooden toys, and Pilibhit for handcrafted wooden flutes made from high-grade bamboo, making all four matching pairs correct.

71. (B) They perform grading, processing, and localized NTFP value addition.
Women's Self-Help Groups play a crucial role in rural livelihood schemes by handling post-harvest operations for minor forest produce. They undertake primary sorting, drying, cleaning, grading, packaging, and basic processing of items like amla, mahua, and wild honey, capturing higher economic returns for rural households.

72. (D) Distress selling to local moneylenders at throwaway prices
Organizing rural women into Self-Help Groups provides collective bargaining power, institutional credit access, and shared storage infrastructure. This structural support prevents individual gatherers from falling into debt traps and eliminates distress selling of raw forest produce to predatory local moneylenders at undervalued prices.

73. (D) Establishing experiential eco-tourism focused on NTFP harvesting and tribal craft culture
Sustainable ecotourism integrates forest conservation with local community participation. Establishing guided nature trails focused on non-timber forest produce harvesting, traditional

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and textile dyeing, making it a valuable industrial forest product.

10. (D) Sustainable extraction of produce without destroying the primary source tree
Non-Timber Forest Produce management relies on harvesting renewable biological items like leaves, fruits, seeds, and exudates while keeping the source trees intact. This approach allows local populations to generate continuous economic benefits without clear-felling standing trees, maintaining total forest canopy cover, biodiversity, and ecosystem resilience over long operational timelines.

11. (A) Tendu leaves
Tendu leaves are widely referred to as Green Gold in Odisha and central Indian states due to their massive contribution to the seasonal tribal economy. Millions of rural gatherers collect these leaves annually for the bidi industry, generating substantial cash income and livelihoods during lean summer months prior to monsoon crop planting.

12. (B) Commercial Timber logs
Minor Forest Produce encompasses non-timber plant components such as leaves, roots, fruits, seeds, gums, resin, fodder, brushwood, and stumps. Commercial timber logs are statutorily categorized as Major Forest Produce due to their primary wood volume, high revenue structure, and distinct silvicultural harvesting policies governed under national forest framework acts.

13. (B) Tendu leaf - Bidi rolling
Tendu leaves provide the essential outer wrapper used in rolling bidis, forming the backbone of a major cottage industry across central India. Salai gum is primarily used in pharmaceuticals and incense, Mahua seeds are extracted for edible oil, and Baib grass is utilized in paper production and cordage making.

14. (A) P-3, Q-1, R-2, S-4
Chir Pine resin is distilled into turpentine and rosin, making it valuable for chemical industries. Baib grass serves as key raw material for paper pulp production. Tendu leaves are harvested for bidi manufacturing, while bamboo is widely utilized for scaffolding, structural framing, paper making, and traditional handicraft production.

15. (C) Natural rubber
Caoutchouc is the technical and historical legal term for natural rubber obtained from the latex of rubber-yielding trees like Hevea brasiliensis and Ficus elastica. The Indian Forest Act of 1927 explicitly incorporates caoutchouc under its statutory definition of forest produce to regulate latex collection, transport, and commercial taxation.

16. (D) Hypertension
Rauvolfia serpentina, commonly known as Sarpagandha, contains bioactive alkaloids such as reserpine in its root system. These natural compounds act on the sympathetic nervous system to lower blood pressure and manage vascular disorders, making it a critical medicinal plant historically extracted from moist forest understories across India.

17. (C) Bark
Quinine is an important alkaloid extracted from the dried bark of Cinchona trees, which were historically cultivated in forest plantations across southern and eastern India. This extracted substance serves as a fundamental therapeutic compound in anti-malarial treatments, making Cinchona bark a valuable medicinal forest produce item.

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18. (B) Sal
Sal is a primary timber tree species classified under Major Forest Produce due to its dense wood used in structural construction. In contrast, Ashwagandha, Giloy, and Sarpagandha are recognized medicinal herbs harvested for their pharmacological active principles used in traditional Ayurvedic medicine formulations and health care treatments.

19. (D) Chir Pine (Pinus roxburghii)
Pinus roxburghii, commonly known as Chir Pine, is the principal tree species tapped for oleoresin in the Himalayan and sub-Himalayan forest belts. The harvested resin is processed into Biroja and turpentine oil, which serve as essential raw materials for synthetic camphor, varnishes, adhesives, and pharmaceutical products.

20. (A) From the resinous secretion of lac insects on host trees
Natural lac is a resinous substance secreted by the microscopic insect Kerria lacca, which parasitizes host trees such as Palas, Kusum, and

and non-timber forest produce originate from sustainably managed forests meeting global environmental and social standards.

84. (A) P-3, Q-1, R-2, S-4
Silviculture is the science of forest crop establishment and growth; usufructs represent legal rights to use resources on another's land; value addition involves processing products to increase economic worth; and sustainable yield denotes harvesting at or below the natural regeneration rate.

85. (B) Sustainable forest management and allowable harvest levels
The National Working Plan Code provides standardized administrative and technical guidelines for preparing forest working plans across India. It establishes scientific frameworks for forest inventory assessment, yield calculation, sustainable harvest limits, biodiversity conservation, and ecosystem restoration across defined forest division boundaries.

86. (C) Non-Timber Forest Produce of animal origin
Honey, beeswax, natural lac, tussar silk, and animal derivatives are categorized as Non-Timber Forest Produce of animal origin. These resources are produced through wild harvesting or semi-cultivation of forest-dependent insects, forming an important non-plant economic component of rural non-timber forest produce operations.

87. (D) Extraction of sal seed butter for chocolate making and cosmetics
Sal seeds contain high concentrations of vegetable fat, which is industrially extracted to produce sal butter. This refined vegetable fat possesses melting properties similar to cocoa butter, making it widely used as a cocoa butter replacer in chocolate production, confectionery manufacturing, and cosmetic formulation.

88. (A) Flowers and seeds
Tribal communities harvest the sweet edible flowers and oil-rich seeds of Madhuca longifolia. Fresh and dried Mahua flowers are used to produce traditional foods, syrups, and beverages, while the seeds are cold-pressed to extract Mahua oil, used for cooking, lighting, soap manufacturing, and medicinal applications.

89. (C) Encouraging monopoly by private traders
The Minimum Support Price for Minor Forest Produce scheme was created to protect tribal gatherers from market exploitation, ensure fair financial returns, promote sustainable harvesting, and improve rural livelihoods. Encouraging private trader monopolies directly contradicts the core anti-exploitation objectives of the program.

90. (B) Madhya Pradesh
Madhya Pradesh pioneered the nationalization of Tendu leaf trade in 1964 by enacting state-level monopoly legislation. This statutory intervention replaced private contractor systems with state-managed procurement networks, aiming to eliminate trader exploitation and secure minimum wages for rural tribal leaf gatherers.

91. (B) II and III only
In 2017, the Indian Forest Act was amended to remove bamboo grown in non-forest areas from the legal definition of a tree, waiving transit permit requirements and encouraging farm cultivation. Consequently, the first statement is incorrect because non-forest bamboo is legally exempted from tree status.

92. (A) Boiling heartwood chips in water and crystallizing extract
Kattha extraction involves chipping the reddish heartwood of Acacia catechu into thin pieces and boiling them in water using aluminum or copper vessels. The concentrated extract is cooled to crystallize Kattha, while the liquid residue yields Cutch, a valuable byproduct used in tanning and dyeing industries.

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93. (B) Making ropes and paper pulp
Baib grass, also known as Bhabar grass, is a tough perennial grass abundant in the Terai and sub-Himalayan tracts. Its long, durable natural fibers possess high tensile strength, making it historically valuable as a raw material for paper pulp manufacturing, cordage, rope weaving, and mat making.

94. (B) Cutting trees near ground level to stimulate multi-stem regrowth
Coppicing is a traditional silvicultural technique where target trees are cut down near ground level to stimulate dormant buds on the stump to sprout vigorous new shoots. This practice produces uniform, fast-growing stems ideal for fuelwood, poles, and small timber without requiring replanting.

herbal knowledge, and indigenous woodcrafts provides visitors with educational experiences while generating sustainable non-extractive revenues for forest-dwelling communities without damaging forest habitats.

74. (A) It encourages locals to preserve forests as tourism depends on sustainable yields.
Integrating forest produce into eco-tourism demonstrates the economic value of standing forests to surrounding communities. When local populations earn direct income by guiding tourists and selling processed forest crafts, they develop strong financial incentives to protect forest ecosystems from illegal logging, fires, and over-extraction.

75. (B) Selective culm harvesting, retaining mixed ages in clumps
Sustainable management of bamboo involves selective harvesting of mature culms while retaining young shoots and intermediate-age stems within the clump. This silvicultural practice maintains continuous rhizome vitality, protects structural clump stability, and ensures steady annual harvests without weakening the overall plant system.

76. (B) To introduce native NTFP species into degraded forest lands for higher productivity
Enrichment planting is a silvicultural technique where valuable native species, particularly non-timber fruit, seed, or resin-yielding plants, are systematically planted into degraded forest gaps or understories. This process increases ecological density, speeds up natural succession, and enhances the economic productivity of forest ecosystems.

77. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Joint Forest Management establishes an operational partnership between state forest departments and local village communities. Local institutions, such as Joint Forest Management Committees, protect nearby forest lands from illegal activities and, in return, receive legal rights to collect usufructs like NTFPs and share timber auction revenues.

78. (C) National Forest Policy, 1988
The National Forest Policy of 1988 marked a fundamental paradigm shift in Indian forestry, transitioning priorities away from commercial revenue extraction toward ecological conservation and meeting the fuelwood, fodder, and non-timber forest produce requirements of tribal and rural populations living in and around forests.

79. (B) The Central Government (MoEFCC)
Under Section 2 of the Forest (Conservation) Act of 1980, state governments or authorities cannot dere-reserve forests or divert forest land for non-forestry purposes without obtaining prior approval from the Central Government, specifically the Ministry of Environment, Forest and Climate Change.

80. (D) Forests acting as watersheds that recharge groundwater for agricultural irrigation
Natural forest vegetation acts as critical watershed cover that absorbs monsoon rainfall, minimizes surface runoff, reduces soil erosion, and facilitates deep groundwater recharge. This hydrological regulation ensures steady stream flows and maintains subsurface water tables necessary for agricultural irrigation in surrounding rural landscapes.

81. (A) It sustains the rural livestock and dairy sector.
Forest pastures, understory grasses, and tree foliage supply essential fodder and grazing grounds for rural cattle, sheep, and goats. Access to these natural feed resources reduces animal rearing costs for smallholder farmers, directly supporting rural livestock management, milk production, and draft power in agrarian economies.

82. (B) That the product comes from a sustainably managed forest following strict standards
Forest certification provides independent verification that a wood or non-timber product originates from a responsibly managed forest. The certification process verifies adherence to strict environmental, social, and economic criteria, assuring consumers that harvesting practices preserved biodiversity, respected local community rights, and maintained long-term forest health.

83. (B) Forest Stewardship Council (FSC)
The Forest Stewardship Council is an independent, non-governmental, international organization that establishes standards for responsible forest management. FSC certification tracks products from forest to consumer, ensuring that timber

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provides direct cash income to rural women, promoting financial autonomy and household gender equity.

107. (A) High perishability of NTFPs and lack of cold storage facilities
Many non-timber forest products, such as fresh fruits, flowers, and tender shoots, possess high moisture content and deteriorate rapidly after collection. The severe shortage of rural cold storage facilities, drying technology, and immediate processing infrastructure forces gatherers to sell perishable stock quickly to local traders at low prices.

108. (C) National Forest Certification Scheme (NCCF)
The Network for Certification and Conservation of Forests developed India's first nationally institutionalized forest management certification scheme. Designed to align with national forest laws and international standards, the NCCF framework provides structured criteria for certifying sustainable timber, non-timber forest produce, and protected forest management units.

109. (B) It tracks forest products from certified forests to end consumers.
Chain of Custody certification provides supply chain traceability for forest products from the certified source forest through processing, manufacturing, and distribution to the final consumer. This process verifies that raw materials used in finished products originate from sustainably managed, legally harvested certified forests.

110. (A) Annatto seeds (Bixa orellana)
Bixa orellana, commonly known as Annatto, yields seeds containing high concentrations of carotenoid pigments like bixin and norbixin. Extracted annatto serves as a natural orange-red coloring agent widely used across international textile, cosmetic, and food processing industries, including dairy products and margarines.

111. (A) Acacia
Gum Arabic is a natural exudate harvested primarily from Acacia senegal and Acacia seyal trees. Tapped through controlled stem incisions, this natural hydrocolloid is extensively used in the global food industry as a emulsifier, in pharmaceuticals as a binder, and in industrial manufacturing processes.

112. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
The Forest Rights Act of 2006 democratized minor forest produce governance by ending state monopolies. By legally vesting ownership, collection, and disposal rights in Gram Sabhas, the statutory framework empowers local village assemblies to regulate harvesting, establish local prices, and trade non-timber products independently.

113. (B) All produce is presumed to belong to Government until proven otherwise.
Under Section 69 of the Indian Forest Act of 1927, when a legal question arises regarding whether any forest produce belongs to the government, the law presumes such produce to be state property until the contrary is proved by valid documentation or legal transit permits.

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114. (B) Procure, process, and value-add MFPs for better market price realization.
Van Dhan Vikas Kendras function as community enterprise hubs where tribal gatherers aggregate harvested minor forest produce. Equipping these centers with primary processing tools enables gatherers to clean, dry, grade, process, and package products, capturing higher market prices and boosting rural enterprise revenues.

115. (A) Gram Sabhas in Scheduled Areas
The Provisions of the Panchayats (Extension to Scheduled Areas) Act of 1996 explicitly empowers Gram Sabhas in Fifth Schedule Areas with the ownership of minor forest produce. PESA mandates that local village assemblies hold statutory authority over MFP management, collection rights, and trade regulation within their boundaries.

116. (C) Teak timber
Teak timber is legally classified as Major Forest Produce due to its high wood volume, structural construction application, and central role in commercial forestry revenue. Non-wood items, such as honey, tendu leaves, and lac, are categorized as Minor Forest Produce or Non-Timber Forest Produce under statutory frameworks.

117. (A) Major produce is state-monopolized; minor rights are devolved to communities.
Major forest produce, comprising structural timber and industrial wood logs, remains strictly

160. (B) Timber harvested periodically without declining long-term forest productivity
Sustainable yield in timber management represents the volume of wood that can be harvested periodically from a forest stand without reducing the capital growing stock or impairing long-term ecological productivity. Adhering to sustainable yield limits prevents timber over-exploitation and maintains continuous forest regrowth over successive rotation cycles.

161. (A) I and II only
Gathering communities face information asymmetry that leads to distress sales, while State Forest Corporations utilize transparent e-tenders to market nationalized products. The third statement is false because TRIFED operates nationwide "Tribes India" outlets and global e-commerce portals, rather than restricting operations to physical retail in Delhi.

162. (B) State designated agencies step in to procure MFP at MSP, preventing gatherer loss
During sudden market slumps or open market price collapses, state-designated procurement agencies intervene directly under the MSP for MFP scheme. These agencies purchase gathered non-timber forest produce at the pre-fixed minimum support price, absorbing market volatility and insulating primary tribal collectors from financial losses.

163. (C) Wild Honey from rock bees (Apis dorsata)
Harvesting wild honey from giant rock bees (Apis dorsata) requires specialized traditional skills, equipment, and courage. Gatherers climb tall trees or steep cliffs at night using natural fiber ropes and smoke to pacify defensive bee colonies, making honey extraction significantly more hazardous than collecting ground fruits or leaves.

164. (B) It proves legal origin and authorizes produce transport across forest check-posts
A Transit Pass serves as an essential regulatory mechanism to combat illegal logging and smuggling. Issued by authorized forest officials, the pass verifies that transported timber or minor forest produce was legally harvested from verified sources, authorizing movement along specified transit routes across administrative check-posts.

165. (B) State holds a monopoly over trade to regulate revenue and protect gatherers
Nationalized forest produce refers to specific high-value non-timber items over which state governments retain exclusive legal control for trade and collection. Nationalization eliminates private middleman networks, regulates market prices, secures state revenue, and enforces minimum wage distributions for primary tribal gatherers.

166. (A) Bleaching and chemical/pressure treatment to prevent borer attacks
Raw harvested bamboo contains starch and moisture that attract powder-post beetles and cause fungal decay. Subjecting raw culms to chemical bleaching, sap leaching, and pressure impregnation with preservatives extracts internal starches and immunizes the fibers against insect attack, transforming raw bamboo into durable industrial construction material.

167. (B) Chicle
Chicle is a natural latex gum harvested by tapping the trunk of the Sapodilla tree (Manilkara zapota), native to tropical forest environments. Historically, this coagulated natural plant latex served as the primary natural elastic base for manufacturing commercial chewing gum before synthetic polymers were introduced.

168. (B) I, II and IV only
Forest Certification is a voluntary market mechanism verifying sustainable management and supply chain traceability. The third statement is incorrect because certification does not restrict timber extraction exclusively to primary virgin forests; it extensively certifies responsibly managed secondary forests, community woodlands, and commercial tree plantations.

169. (B) To achieve poverty alleviation for forest communities while maintaining ecological balance
Contemporary Indian forest policies focus on integrating forest management with rural development to alleviate poverty among forest-dwelling communities while maintaining ecological stability. Empowering local populations through usufruct rights and sustainable non-timber harvesting aligns socio-economic upliftment with biodiversity conservation and ecosystem protection.

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legal harvesting, details product quantity and destination, and prevents illegal timber smuggling across administrative check-posts and state boundaries.

129. (A) Khadi and Village Industries Commission (KVIC) / State Boards
The Khadi and Village Industries Commission, along with its State Khadi and Village Industries Boards, provides financial subsidies, technical support, and marketing infrastructure to rural micro-enterprises. KVIC actively supports village-level processing units for minor forest produce, including herbal processing and food preservation enterprises.

130. (C) Lean agricultural months (summer and pre-monsoon) when food stocks are low
Tribal dependency on non-timber forest produce peaks during the summer and pre-monsoon months. During this lean period, agricultural activities are minimal, farm wage labor is unavailable, and stored food reserves run low, making the harvest and sale of tendu leaves, mahua flowers, and wild seeds vital for survival.

131. (B) Jiggit powder (bark of Machilus macrantha)
Jiggit powder, produced by grinding the dried bark of Machilus macrantha (Persea macrantha), serves as the primary natural binder in the agarbatti industry. Its glutinous, adhesive properties bind fragrant herbal powders and charcoal tightly onto bamboo sticks without altering burning characteristics or fragrance profiles.

132. (B) They are two Lac insect strains producing different lac qualities based on host tree and season.
Kusmi and Rangeeni represent the two distinct biological strains of the lac insect, Kerria lacca, cultivated in India. The Kusmi strain raised on Kusum trees produces lighter, superior-quality lac, while the Rangeeni strain cultivated on Palas and Ber trees accounts for the majority of commercial volume.

133. (A) I, II and IV only
The Terai region yields Sal timber and Baib grass, the Vindhyan region produces Tendu leaves, and resin tapping is practiced in northern pine forests. Sandalwood is not extensively cultivated in UP and does not form its primary forest revenue, rendering the third statement inaccurate.

134. (D) Kattha extraction - Mathura
Mathura is located in the dry Gangetic plain and is not a center for Kattha extraction. Kattha processing relies on heartwood harvested from Acacia catechu trees, which are situated in the Bhabar and Terai forest belts of northern UP districts like Bareilly, Bijnor, and Lakhimpur Kheri.

135. (B) Solar drying, storage, and processing into energy bars or squashes
Transitioning from selling fresh, perishable Mahua flowers to adopting solar drying, proper storage, and value-added processing significantly enhances income. Transforming flowers into consumer products like energy bars, jams, or syrups prevents spoilage, extends shelf life, and allows gatherers to sell processed goods at higher market prices.

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136. (B) It handles timber and NTFP harvesting, transport, and auctions to eliminate middlemen.
The Uttar Pradesh Forest Corporation is the commercial arm of the state government responsible for logging, extraction, transit, and open e-auctions of timber and nationalized minor forest produce. UPFC operations ensure systematic forest exploitation according to working plans while protecting revenue and removing private intermediaries.

137. (A) Cellulose fibers obtained from wood and bamboo
The paper and pulp industry relies on cellulose fibers extracted from plant materials. Softwood, hardwood, bamboo, and fibrous grasses are mechanically and chemically processed to break down lignin, liberating long cellulose fibers that are formed into paper sheets, cardboard, and specialized packaging materials.

138. (A) Leather tanning industry
Tannins are polyphenolic vegetable compounds extracted from the bark, wood, and fruits of species like Babul, Harad, and Wattle. Tannins bind and stabilize animal skin proteins, making them essential raw materials in the commercial leather tanning industry to convert raw hides into durable leather.

managed and harvested under state working plans. Conversely, governance of minor forest produce has been progressively devolved to local communities and Gram Sabhas under legislative acts like PESA 1996 and FRA 2006.

118. (A) Harad, Baheda, and Amla
Triphala is a foundational Ayurvedic herbal formulation composed of three dried medicinal fruits: Harad (Terminalia chebula), Baheda (Terminalia bellirica), and Amla (Emblica officinalis). These fruits are harvested from natural forest tracts and form a commercially valuable category of minor forest produce.

119. (A) P-3, Q-1, R-2, S-4
Varanasi and Chitrakoot are known for traditional wooden toys; Meerut serves as a sports goods manufacturing hub using willow and mulberry; Saharanpur features a paper and pulp industry utilizing Baib grass; and Mirzapur and Sonbhadra represent major regional centers for Tendu leaf collection and bidi trade.

120. (C) It is a regenerative grass harvested in 3-4 year cycles without replanting.
Bamboo is a fast-growing perennial grass that reaches structural maturity within three to four years. Its extensive underground rhizome network continuously produces new culms, allowing regular selective harvesting without killing the parent plant or requiring artificial replanting, making it a highly sustainable raw material.

121. (B) The science of growing and cultivating forest crops (trees)
Silviculture is the branch of forestry that focuses on the theory and practice of controlling the establishment, growth, composition, health, and structural quality of forest stands. It utilizes managed interventions, such as thinning, pruning, and coppicing, to optimize sustainable timber and non-timber biomass production.

122. (B) Setting uncontrolled annual forest fires to clear undergrowth for fruit gathering
Setting uncontrolled fires to clear forest floor litter for gathering fruits like Mahua destroys natural tree regeneration, damages soil organic matter, kills beneficial soil fauna, and weakens parent trees. This destructive practice degrades long-term forest health and significantly reduces future non-timber produce yields.

123. (B) Indian Council of Forestry Research and Education (ICFRE)
The Indian Council of Forestry Research and Education is the apex autonomous body under the Ministry of Environment, Forest and Climate Change. ICFRE directs, conducts, and coordinates holistic forestry research, environmental education, and technological extension services across its specialized regional research institutes throughout India.

124. (B) Dehradun
The Forest Research Institute is a premier national institution for forestry education and scientific research, situated in Dehradun, Uttarakhand. Established originally as the Imperial Forest Research Institute in 1906, FRI carries out advanced research on wood anatomy, silviculture, forest products, and sustainable resource conservation.

125. (A) Harad / Baheda
Myrobalan is the commercial and trade name applied to the dried, tannin-rich fruits harvested from Terminalia chebula (Harad) and Terminalia bellirica (Baheda). These forest fruits are included under the Minimum Support Price for MFP scheme due to their heavy usage in leather tanning and Ayurvedic pharmaceuticals.

126. (A) I and II only
India is a net importer of industrial roundwood to meet domestic structural demands and an exporter of value-added non-timber forest products like plant extracts, gums, and resins. The third statement is false as international trade in wild animal parts is strictly prohibited under national laws and CITES provisions.

127. (B) Sandalwood oil
Sandalwood oil, steam-distilled from the aromatic heartwood of Santalum album, is a high-value essential oil with high global demand. Possessing a rich, persistent woody aroma and natural fixative properties, it is extensively exported for use in luxury perfumes, cosmetics, and traditional pharmaceuticals.

128. (B) A legal permit issued by the Forest Department for movement of produce
A Transit Pass is an official statutory permit issued by forest authorities to authorize the transportation of specified forest produce across public routes. The document verifies

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woody perennials with annual crops or livestock diversifies agricultural income, generates localized fuelwood, fodder, and timber supplies, improves farm soil fertility, and reduces extraction pressures on nearby natural forest reserves.

150. (B) Plant trees on commons and roadsides to meet rural fuelwood and fodder needs
The Social Forestry initiative in Uttar Pradesh was launched to establish tree plantations on non-forest lands, village commons, canal banks, and roadside strips. The program aimed to fulfill rural community demands for fuelwood, small timber, and fodder, thereby reducing pressure on natural reserved forests.

151. (B) TRIFED
TRIFED is the specialized national entity under the Ministry of Tribal Affairs tasked with creating digital platforms, including the "Tribes India" e-commerce portal. This digital ecosystem connects tribal gatherers and enterprises with national markets, facilitating online sales of authentic forest produce and tribal handicrafts.

152. (B) It serves as organic manure in surrounding farm fields to maintain soil fertility
Forest floor leaf litter is routinely gathered by rural communities to prepare farm compost and animal bedding. Incorporating decomposed organic litter into adjacent agricultural soils replenishes essential plant nutrients, improves soil organic carbon content, enhances moisture retention, and supports sustainable crop yields without chemical inputs.

153. (B) Fuelwood (firewood)
Fuelwood extracted from forests and rural commons remains the primary energy source for cooking and heating across rural India. Millions of households depend on collected deadwood, fallen branches, and woody biomass to fulfill daily domestic energy requirements due to its immediate local availability and zero cash cost.

154. (A) P-2, Q-3, R-1, S-4
Turpentine oil is distilled from Pine resin; Kattha is extracted from Khair heartwood; Bidis are rolled using Tendu leaves; and wild Tussar or Muga silk is produced by silkworms reared on host forest trees like Arjuna, Asan, and Sal.

155. (B) By aggregating individual collections to negotiate bulk prices and processing equipment
Individual tribal gatherers often face weak market bargaining power due to small harvest volumes. Van Dhan Vikas Kendras solve this issue by aggregating produce from multiple local Self Help Groups, creating economies of scale that enable bulk transportation, direct negotiation with large industrial buyers, and shared access to processing equipment.

156. (C) The political affiliation of the forest workers
Forest management certification evaluates operational practices against environmental, legal, and socio-economic criteria, including legal compliance, biodiversity preservation, soil conservation, and indigenous worker rights. Personal political affiliations of forestry workers are completely irrelevant to sustainable forest management evaluations and certification standards.

157. (B) Chain of Custody Certification (CoC)
Chain of Custody certification monitors and documents the movement of forest products along every stage of the supply chain, from the certified forest through processing, manufacturing, and transport to the end retailer. This process ensures that certified sustainable materials remain identifiable and separated from uncertified sources.

158. (B) PEFC (Programme for Endorsement of Forest Certification)
The Network for Certification and Conservation of Forests developed India's national forest management certification standard, which is formally endorsed by the Programme for the Endorsement of Forest Certification. This global endorsement ensures international recognition for Indian certified wood and non-timber forest produce in export markets.

159. (C) It gives access to premium markets demanding legally and sustainably sourced products
Forest certification provides exporters with verified proof that their wooden products originate from legally and sustainably managed forests. This certification is essential for entering regulated international markets, such as Europe and North America, where strict timber regulations restrict imports of uncertified or illegally harvested timber products.

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139. (B) To provide a price safety net for primary gatherers against market fluctuations
Establishing a Minimum Support Price for minor forest produce creates a price floor that shields primary tribal collectors from sudden market price drops and trader exploitation. When open market prices collapse below the fixed floor, state agencies step in to procure gathered produce at the guaranteed price.

140. (A) 2 - 4 - 3 - 1
Processing medicinal herbs begins with primary collection and washing to remove dirt. The cleaned material undergoes controlled solar drying and quality grading, followed by secondary extraction or fine powdering of active botanical ingredients. The refined herbal product is then packaged into sanitized retail units for commercial distribution.

141. (B) Implementing a digital National Transit Pass System for verifiable produce movement
To streamline timber movement and curb transit pass forgery, forest departments have adopted the National Transit Pass System. This unified online portal issues QR-coded, digitally verifiable transit permits, facilitating seamless inter-state and intra-state movement of forest produce while enhancing transparency and law enforcement tracking.

142. (B) It destroys host trees, drastically reducing available seeds, fruits, leaves, and resins
Illegal timber felling degrades forest canopy architecture and eliminates mature seed-bearing trees, directly impacting non-timber forest produce availability. Destroying host trees reduces the supply of wild fruits, medicinal barks, gums, and resins, while disturbing understory ecological microclimates necessary for non-timber plant regeneration.

143. (D) Both (A) and (B)
Unauthorized collection of forest produce from National Parks and Sanctuaries is prohibited under Section 35 and Section 27 of the Wildlife (Protection) Act of 1972, as well as provisions of the Indian Forest Act of 1927. These statutes restrict commercial resource extraction within protected areas to safeguard wildlife habitats.

144. (B) From all forest lands including reserved and protected forests or sanctuaries
Section 3(1)(c) of the Forest Rights Act of 2006 secures rights to collect, use, and dispose of minor forest produce from all forest lands. This statutory entitlement applies across reserved forests, protected forests, sanctuary boundaries, and unclassed forest lands traditionally accessed by forest-dwelling communities.

145. (B) Over-tapping depletes tree vitality, impairs regeneration, and eventually kills the tree
Excessive or deep tapping of Boswellia serrata trees for Salai gum-resin disrupts internal nutrient transport systems and exposes inner cambium layers to insect infestations and fungal pathogens. Destructive over-tapping causes high tree mortality, reduces viable seed set, and leads to severe population declines across dry deciduous forests.

146. (B) Community trails where tourists experience honey collection and buy local organic honey
Sustainable ecotourism links forest conservation with low-impact community activities. Guided trails showcasing traditional wild honey collection or botanical utilization educate visitors and create non-extractive revenue streams. This model provides direct financial returns to forest dwellers without causing habitat destruction or over-exploiting natural resources.

147. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Developing small-scale, forest-based enterprises creates non-agricultural employment, primary processing jobs, and steady micro-enterprise revenues directly within remote forest-fringe villages. Providing stable local economic opportunities reduces distress migration of rural and tribal populations to congested urban centers in search of manual labor.

148. (A) Removing bark in longitudinal strips from one side to let cambium heal
Sustainable bark harvesting involves removing bark in narrow vertical strips from one side of the trunk, leaving adjacent vertical sections untouched. This partial harvesting method keeps the cambium layer intact, allowing phloem transport to continue and enabling the tree to heal damaged bark without suffering dieback or mortality.

149. (B) It integrates trees into farm lands to boost yields and diversify farmer income
Agroforestry integrates multipurpose tree species into agricultural landscapes. Combining

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170. (B) Forests support rural livelihoods, while community action ensures forest preservation.
The relationship between forest produce and the rural economy is deeply interdependent. Forests provide crucial livelihood support through fuelwood, fodder, grazing resources, and non-timber produce, while organized community protection and sustainable harvesting practices ensure long-term ecological preservation and resource availability for future generations.

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CHAPTER 10
Human Wildlife Conflicts

1. Which of the following best defines human-wildlife conflict in the context of wildlife management?
(A) The natural predator-prey relationship occurring exclusively within protected forest boundaries
(B) Any interaction between humans and wildlife that results in negative impacts on human social, economic, or cultural life, on the conservation of wildlife populations, or on the environment
(C) The process of humans adopting wild animals for domestication and agricultural use
(D) The seasonal migration of wildlife species from one protected area to another without human interference

2. What is the primary anthropogenic driver behind the recent global and regional increase in human-wildlife conflict incidents?
(A) The sudden genetic mutation in wildlife causing aggressive behaviour
(B) The decrease in the average global temperature
(C) The natural evolutionary shift of herbivores into carnivores
(D) Human population expansion leading to habitat encroachment and fragmentation

3. In the context of habitat degradation, which agricultural practice most severely exacerbates human-wildlife conflict near forest fringes?
(A) Slash-and-burn shifting agriculture extending into buffer zones
(B) Cultivation of medicinal plants within polyhouses
(C) Organic farming using natural compost in urban areas
(D) Vertical farming inside city limits

4. Which of the following is considered a direct consequence of linear infrastructure (like highways and railways) cutting through a forest?
(A) Complete elimination of all herbivore species
(B) Immediate conversion of the forest into a grassland ecosystem
(C) Habitat fragmentation leading to increased edge effects and wildlife venturing into human settlements
(D) Reduction in the number of invasive weed species

5. How does the degradation of natural prey bases in protected areas directly influence human-carnivore conflict?
(A) Carnivores enter human habitations to prey on domestic livestock and dogs
(B) Carnivores shift their diet entirely to naturally occurring wild fruits and forest vegetation
(C) Carnivores undertake long-distance transoceanic migrations in search of abundant native prey
(D) Carnivores undergo rapid evolutionary body size reduction to lower nutritional requirements

6. Nilgai (Boselaphus tragocamelus) is frequently involved in human-wildlife conflict in Uttar Pradesh primarily due to which reason?
(A) They act as opportunistic apex predators that actively hunt domestic cattle in open pastures
(B) They display heightened territorial aggression toward humans specifically during the monsoon season
(C) They systematically dismantle and destroy solar energy infrastructure installed in remote villages
(D) They damage agricultural crops in large herds within human-dominated farming landscapes

7. Which of the following livestock management practices makes cattle highly vulnerable to leopard attacks in areas adjoining forests?
(A) Housing livestock inside reinforced concrete, predator-proof shelters with secure night doors
(B) Leaving untethered cattle overnight at forest fringes after grazing in protected areas

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(C) Deploying specialized, highly trained guard dogs to protect free-ranging herds during daylight hours
(D) Confining livestock permanently within village courtyards enclosed by high perimeter brick walls

8. In addressing crop damage, what does the term 'Crop Guarding' generally entail in traditional Indian contexts?
(A) Applying high-concentration chemical pesticides and synthetic repellents directly across mature crop fields
(B) Enclosing individual growing fruits within protective polyethylene covers to prevent pest infestation
(C) Staying overnight in elevated watchtowers (machaans) to scare away crop-raiding animals
(D) Harvesting agricultural crops several months prior to their natural maturity to avoid seasonal animal visits

9. Which problem-causing wildlife species is technically not classified under the Wildlife (Protection) Act, 1972, yet remains a significant cause of conflict and livestock loss in rural areas?
(A) Snow Leopard
(B) Indian Wolf
(C) Asiatic Black Bear
(D) Feral Dogs

10. Given below are two statements, one labeled as Assertion (A) and the other labeled as Reason (R).
Assertion (A): Human encroachment into forest buffer zones significantly increases the frequency of human-wildlife conflicts.
Reason (R): Encroachment reduces the spatial distance between human settlements and wildlife habitats, forcing both to compete for overlapping resources.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

11. Which phenomenon best explains why elephants frequently venture out of protected areas to raid crops like paddy and sugarcane?
(A) Rigid territorial dominance instincts that force elephant herds to continuously expand their spatial movement boundaries
(B) Crops provide higher nutritional value and palatability than wild forest forage
(C) Strong behavioral attraction toward high-intensity artificial lighting systems deployed near human habitations
(D) Temporary disorientation and loss of directional navigation capabilities caused by heavy seasonal monsoon rains

12. In Uttar Pradesh, human-elephant conflict is historically most prevalent in which geographical region?
(A) The Bundelkhand plateau
(B) The Shivalik foothills and Terai region
(C) The Vindhyan ranges of Mirzapur
(D) The central Gangetic plains near Kanpur

13. What specific agricultural produce is known to actively attract wild elephants due to its strong fermentation odour, frequently leading to property damage?
(A) Brewed Mahua liquor
(B) Raw unprocessed cotton bales
(C) Dried mustard seed crops
(D) Cumin and coriander spice plants

14. Which physical characteristic of male elephants (bulls) generally makes them more prone to engaging in high-risk crop raiding compared to female herds?
(A) Complete visual impairment forcing lone males to depend on human agricultural crops for daily survival
(B) An absolute dietary shift toward carnivory requiring them to actively hunt domestic livestock in villages
(C) Higher energy needs to sustain musth and enhance reproductive success
(D) Severe physiological inability to digest native forest grasses, shrubs, and tree foliage

15. Select the correct sequential order of escalating measures typically taken by villagers to deter crop-raiding elephants:
(A) Firing shotguns → Shouting → Beating drums → Lighting fires
(B) Shouting and beating drums → Lighting fire torches (mashals) → Throwing chili smoke → Calling forest department for tranquilisation
(C) Calling forest department → Shouting → Lighting fires → Evacuating village
(D) Throwing chili smoke → Calling forest department → Beating drums → Shouting

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16. In the Terai Arc Landscape (TAL), why do leopards frequently inhabit sugarcane fields, leading to human-leopard conflict?
(A) Leopards undergo seasonal dietary changes to feed exclusively on the high-sugar sap of standing sugarcane stalks
(B) Sugarcane agricultural lands remain completely undisturbed by agricultural workers throughout the entire annual cultivation cycle
(C) Sugarcane provides dense structural cover similar to tall grass for hiding and breeding
(D) Microclimatic conditions within standing sugarcane crops produce freezing ambient temperatures that leopards actively prefer

17. A sudden spike in human-tiger conflict involving a specific tiger usually indicates which of the following?
(A) The tiger has successfully established a dominant breeding territory within the undisturbed core zone
(B) The tiger is old, injured, or displaced from core habitats by stronger rivals
(C) The tiger is initiating a long-distance seasonal migration across state borders in search of cooler climates
(D) The entire regional tiger population has recently experienced sudden ecological extinction across the reserve

18. What time of day is human-leopard conflict most likely to occur in villages situated near forest fringes?
(A) High noon hours when solar intensity and daily ambient temperatures reach their absolute peak
(B) Mid-morning periods when agricultural workers are actively spraying chemical pesticides across crop fields
(C) Exclusively during peak daylight hours when human presence across agricultural landscapes is highest
(D) Dawn, dusk, and night hours when leopards are naturally active

19. According to wildlife experts, what is a "sink population" in the context of tiger dynamics and conflict?
(A) Transient tigers forced into marginal fringe habitats where conflict risks are high
(B) An aquatic adaptation of big cat populations that resides permanently submerged in riverine systems
(C) A specialized tiger subgroup that completely refrains from hunting natural wild herbivore species
(D) A fully stable, self-sustaining breeding population residing within the core sanctuary zone

20. Consider the following statements regarding the obstruction of wildlife corridors:
I. Corridors facilitate genetic exchange between isolated wildlife populations.
II. Construction of canals and highways through corridors decreases the chances of human-wildlife conflict.
III. Broken corridors force migratory species to navigate through human-dominated landscapes.
Which of the above statement(s) is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

21. Which specific infrastructure design intervention is increasingly used on national highways to prevent the fragmentation of wildlife corridors and reduce roadkill?
(A) Constructing eco-bridges (overpasses) and animal underpasses
(B) Installing bright floodlights across the entire forest stretch
(C) Building continuous 20-foot high concrete walls along both sides of the road
(D) Removing all vegetation within a 5-kilometer radius of the highway

22. How does climate change indirectly exacerbate human-wildlife conflict regarding water resources?
(A) Extreme flood events that instantly drown entire terrestrial wildlife populations within core forests
(B) Rapid salinization converting all inland fresh water resources across forest reserves into saltwater
(C) Permanent freezing of inland water bodies that prevents all animal species from accessing liquid water
(D) Drying up forest water holes, driving wildlife into villages for water

23. What impact does climate-induced alteration in plant phenology (timing of fruiting and flowering) have on wildlife behavior?

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(A) Wildlife species enter a continuous multi-season hibernation cycle lasting throughout the operational year
(B) Scarcity of wild fruits leads bears and omnivores to raid crops and orchards
(C) Wild herbivore populations undergo physiological shifts toward a permanently carnivorous dietary pattern
(D) Forest flora synthesizes hyper-toxic secondary compounds that eliminate localized agricultural pest populations

24. Invasive alien plant species like Lantana camara increase the risk of conflict by:
(A) Significantly improving the nutritional quality and abundance of forage available to domestic cattle
(B) Creating an impenetrable biological barrier that prevents wild animals from crossing forest boundaries
(C) Reducing native forage, forcing herbivores into farmland for food
(D) Releasing lethal atmospheric chemical compounds that eliminate local populations of wild carnivores

25. Which of the following is considered a non-lethal biological mitigation strategy to reduce human-elephant conflict?
(A) Installing military-grade explosive landmines along perimeter boundaries of agricultural fields
(B) Introducing aggressive non-native apex predators to hunt and suppress wild elephant populations
(C) Administering lethal chemical toxins directly into surface water sources adjoining farmland
(D) Planting deterrent crops like chili, ginger, and tobacco on forest fringes

26. What is the primary purpose of constructing an Elephant Proof Trench (EPT)?
(A) To physically prevent elephants from entering crop fields from the forest
(B) To serve as pitfall traps for capturing wild elephants prior to commercial trade and auction
(C) To construct subterranean movement tunnels enabling herds to safely cross busy expressways
(D) To capture and store seasonal rainwater run-off for community agricultural use during dry seasons

27. Why do traditional Elephant Proof Trenches (EPTs) frequently fail in their objective over time?
(A) Elephants undergo rapid morphological changes allowing them to easily leap across structural trench gaps
(B) Soil erosion and infilling by humans or animals reduce their physical depth
(C) Trench excavations induce severe hydro-ecological disruption causing widespread forest inundation
(D) Accumulated organic debris inside trench beds undergoes spontaneous thermal combustion in summer

28. How does 'Bio-fencing' differ from standard physical fencing in conflict management?
(A) Bio-fencing generates low-voltage electrical currents supplied continuously through bio-gas generation systems
(B) Bio-fencing uses thorny or repellent live plants like agave and cactus as physical deterrents
(C) Bio-fencing utilizes synthetic biochemical sprays applied directly to foliage to fatal effect on wildlife
(D) Bio-fencing relies exclusively on domesticated guard dogs deployed along property boundaries day and night

29. What is a "Beehive Fence" and how does it prevent human-elephant conflict?
(A) Wire-connected active beehives that release swarming bees when disturbed, deterring elephants
(B) Barriers constructed from synthetic honeycomb panels designed to visually disorient approaching animals
(C) Perimeter structures smeared with natural honey to attract wild elephants into specialized containment zones
(D) Protective wooden enclosures erected around native bee colonies to prevent destruction by megaherbivores

30. Which of the following is a primary objective of introducing compensation and insurance schemes for wildlife damage?
(A) To provide direct financial incentives for local farmers to independently hunt crop-damaging wildlife
(B) To construct absolute physical barriers that permanently prevent wild animals from accessing farm fields

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(C) To reduce retaliatory killings by offsetting economic losses incurred by farmers
(D) To allocate government funds for transforming rural mud dwellings into permanent concrete housing

31. In Uttar Pradesh, if a person is killed in a wild animal attack, to whom is the ex-gratia compensation amount primarily disbursed?
(A) To the Gram Pradhan of the village
(B) To the District Magistrate's discretionary fund
(C) To the local Non-Governmental Organization (NGO)
(D) To the legal heir or dependents of the deceased

32. Which of the following conditions might render a farmer ineligible for crop damage compensation by the Forest Department?
(A) The agricultural holding is situated immediately adjacent to a designated sanctuary perimeter boundary
(B) The crop loss was inflicted by a species classified strictly under Schedule I of the national protection act
(C) The crop was raised illegally on encroached forest land
(D) The affected farmer officially submitted the loss report to authorities within the mandatory 24-hour window

33. The 'Pradhan Mantri Fasal Bima Yojana' (PMFBY) covers crop losses. What is a major challenge in using such general insurance schemes for wildlife-induced crop damage?
(A) National crop insurance frameworks restrict coverage exclusively to damages inflicted by non-native invasive species
(B) Schemes calculate losses at block levels rather than evaluating localized plot damage
(C) Insurance guidelines explicitly ban agricultural landholders in forest fringe zones from purchasing policies
(D) Wildlife encounters universally destroy entire crop yields, leading insurers to exclude them from standard policies

34. What is the fundamental mechanism of a Solar Powered Electric Fence used for wildlife deterrence?
(A) It delivers a continuous, high-amperage lethal shock that permanently eliminates target wildlife species
(B) It powers high-intensity halogen floodlights to visually dazzle and disorient approaching megafauna
(C) It harnesses solar power to maintain fence wiring at extreme thermal temperatures that burn on contact
(D) It delivers a brief, non-lethal shock creating a psychological boundary

35. Match the items in List I with those in List II.
List I: (Conflict Mitigation Measure)
P. Beehive Fences
Q. Predator-proof night shelters
R. Fox lights (randomly flashing lights)
S. Chilli smoke deterrents
List II: (Target Species / Function)
1. Leopards and Tigers
2. Elephants
3. Nocturnal carnivores
4. Elephants and wild boars
(A) P-2, Q-1, R-3, S-4
(B) P-4, Q-3, R-2, S-1
(C) P-1, Q-2, R-4, S-3
(D) P-3, Q-4, R-1, S-2

36. What is a critical maintenance requirement for the effective long-term functioning of a solar fence?
(A) Systematically replacing all photovoltaic solar panels on a monthly operational schedule
(B) Coating conductible fence wires in thick dark camouflage paint to conceal them from animals
(C) Clearing vegetation near wires to avoid power loss
(D) Submerging storage batteries in standing water to ensure continuous cooling during peak heat

37. In early warning systems (EWS) for wildlife, what role do Infrared (IR) sensors play?
(A) They detect animal heat and movement, sending immediate alerts to officials
(B) They automatically discharge pneumatic chemical tranquiliser darts upon sensing motion across the perimeter
(C) They release continuous high-decibel acoustic frequencies designed to permanently impair animal auditory systems
(D) They trigger intense localized heating mechanisms that instantly sever perimeter fencing upon animal contact

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38. How is cellular technology primarily being utilized in Uttar Pradesh to mitigate human-elephant conflict?
(A) Wild elephants undergo acoustic conditioning to recognize distinct cell phone ringtones as warning signals
(B) Cellular tower foundations are constructed as solid structural barricades directly across elephant migration paths
(C) Heavy-lift unmanned drones utilize cellular signals to physically carry straying elephants back to sanctuaries
(D) Forest officials broadcast bulk SMS and messaging alerts about herd locations to locals

39. What is the primary function of a Rapid Response Team (RRT) in the Forest Department?
(A) To execute large-scale, rapid afforestation and sapling plantation drives during seasonal monsoon rains
(B) To quickly arrive at conflict sites, control crowds, and protect people and wildlife
(C) To perform multi-year academic field investigations into population genetics and evolutionary biology
(D) To clear mature timber stands and remove fallen trees prior to the arrival of seasonal rains

40. Consider the following statements regarding the rehabilitation and relocation of problem wildlife:
I. Translocation is always successful and guarantees the animal will not cause conflict again.
II. Captured problem animals like leopards often try to navigate back to their original territory, a phenomenon known as 'homing instinct'.
III. Problem carnivores deemed unfit for release are sent to lifetime care facilities or zoos.
IV. Tranquilisation is heavily dependent on the ambient temperature and the animal's physical condition.
Which of the above statement(s) is/are correct?
(A) I, II, and III only
(B) II, III, and IV only
(C) I, III, and IV only
(D) I, II, III, and IV

41. When chemically capturing (tranquilising) a problem leopard, why is it crucial to manage the surrounding crowd of local people?
(A) Spectators in unmanaged crowds frequently attempt to confiscate specialized chemical capture equipment from veterinary staff
(B) Immobilization drugs require a fully silent environment maintained for twenty-four consecutive hours to take effect
(C) Chemically tranquilized big cats temporarily emit infectious airborne pathogens that pose severe public health risks
(D) High stress and noise can induce adrenaline spikes, delaying sedation or triggering attacks

42. What happens to a 'man-eating' tiger once it is successfully captured and its identity is confirmed beyond doubt, as per standard NTCA guidelines?
(A) It is placed in permanent captivity at a zoo or rescue center without release
(B) It is subjected to immediate summary execution by local law enforcement officers on site
(C) It is translocated directly into the undisturbed core zone of an alternative national reserve
(D) It is sold through commercial auctions to international entertainment circuses operating abroad

43. Why is active local community participation considered essential for successful human-wildlife conflict management?
(A) Forest department personnel lack legal authority to access private rural lands without written village consent
(B) Locals are first responders whose traditional knowledge and cooperation prevent retaliation
(C) Statutory regulations obligate rural residents to financially reimburse state agencies for operational expenses
(D) Free-ranging wild animals respond exclusively to auditory commands issued by indigenous community members

44. What is the role of 'Bagh Mitras' (Tiger Friends) designated in areas surrounding Tiger Reserves in Uttar Pradesh?
(A) To form armed local civilian squads responsible for culling tigers that move beyond reserve boundaries
(B) To serve as local volunteers tracking big cats, spreading awareness, and managing crowds
(C) To systematically remove tiger cubs from wild dens for village domestication and agricultural work

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76. In an incident where an elephant wanders into a highly populated urban area, what is the first operational priority of the Rapid Response Team (RRT)?
(A) Deploying armed personnel to lethal effect without attempting non-lethal intervention
(B) Securing a safety perimeter around the animal and controlling local crowds
(C) Distributing large quantities of agricultural sugarcane to distract the elephant
(D) Coordinating with television press teams to arrange live broadcasting opportunities

77. Which modern geospatial tool is heavily utilized to map conflict hotspots and plan the alignment of wildlife corridors?
(A) Geographic Information System
(B) Medical stethoscope devices
(C) Atmospheric pressure barometers
(D) Geological seismograph equipment

78. In the context of HWC, what is "retaliatory killing"?
(A) Interspecific fights where wild animals kill rival territorial species inside core forest zones
(B) Authorized state-sponsored culling operations targeting designated vermin populations in farm zones
(C) Locals killing wildlife in revenge for lost lives, livestock, or crops
(D) Carnivores capturing live natural prey specifically to train juvenile cubs in hunting techniques

79. What role do domestic feral dogs play in the ecology of human-leopard conflict?
(A) They act as effective village defenders, successfully deterring big cats from entering residential areas
(B) They compete directly with wild big cat populations for naturally occurring forest fruits and vegetation
(C) They routinely hybridize with wild leopards, producing aggressive offspring across rural landscapes
(D) They serve as easy prey, sustaining leopard numbers near villages

80. Why is the rescue of an animal fallen into an uncovered well considered a critical aspect of conflict management?
(A) Trapped wild animals deliberately contaminate village drinking water supplies through biological toxins
(B) Ownership of private agricultural wells automatically transfers to state forest authorities upon animal entry
(C) It addresses infrastructure hazards through prompt rescue, preventing animal deaths
(D) It provides conclusive scientific evidence that wild species are evolving subterranean lifestyle habits

81. Which section of the Wildlife (Protection) Act, 1972 deals explicitly with the "Hunting of Wild Animals to be permitted in certain cases" (e.g., when an animal becomes dangerous to human life)?
(A) Section 2
(B) Section 11
(C) Section 27
(D) Section 38

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82. Which authority is legally empowered under the Wildlife (Protection) Act, 1972 to declare a Schedule I wild animal (e.g., Tiger) as a threat to human life and permit its hunting or capture?
(A) The local Sub-Divisional Magistrate (SDM)
(B) The Village Pradhan
(C) The Station House Officer (SHO) of the local police station
(D) The Chief Wildlife Warden of the State

83. The introduction of 'Agro-forestry' models near forest edges helps mitigate conflict by:
(A) Supplying alternative fuel and fodder, lowering community reliance on core forests
(B) Establishing wide tracts of completely cleared land that wild animals refuse to traverse
(C) Promoting the uninhibited spread of non-native invasive plant species along forest boundaries
(D) Systematically replacing naturally occurring wild species with domesticated farm livestock

84. Which of the following best describes 'habituation' in wildlife, a major concern for conflict escalation?
(A) When an animal rapidly modifies its anatomical skin coloration to blend into residential village walls
(B) When an animal population executes intercontinental migration movements across oceanic boundaries
(C) Loss of natural fear of humans due to repeated exposure or feeding

(C) Bijnor
(D) Ballia

53. The Katerniaghat Wildlife Sanctuary is a critical hotspot for human-wildlife conflict in UP. On which river's basin is it situated?
(A) Girwa (Ghaghara system)
(B) Yamuna
(C) Hindon
(D) Gomti

54. Buffer zone management aims to reduce conflict by:
(A) Constructing continuous, reinforced concrete perimeter walls entirely surrounding core reserve zones
(B) Permitting unrestricted heavy industrial operations to deter wild animals through noise pollution
(C) Transforming all surrounding reserve land into high-density commercial agricultural production
(D) Regulating fringe land use to safely absorb wildlife spillover from core areas

55. Consider the following statements regarding the Wildlife (Protection) Act, 1972, and conflict management:
I. Section 11 of the Act permits the hunting of a Schedule I animal if it has become dangerous to human life.
II. Only the Chief Wildlife Warden of the State can order the killing of a man-eating Schedule I animal.
III. Any citizen can declare a tiger as a man-eater and hunt it legally without permission.
Which of the above statement(s) is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

56. Under the provisions of the Wildlife (Protection) Act, 1972, killing a wild animal in self-defence is legally permissible. However, what is the legal status of the animal killed in such a situation?
(A) It becomes the personal property of the person who killed it
(B) It must be sold in the open market
(C) It remains the property of the State Government
(D) It must be immediately buried by the person without informing authorities

57. Which type of public awareness programme is most effective in mitigating panic during a leopard straying incident in a populated area?
(A) Publishing and circulating technical academic research papers written in foreign languages
(B) Broadcasting television documentaries highlighting lion behavior across African savanna ecosystems
(C) Installing non-reflective informational signboards deep within undisturbed core forest zones
(D) Running community mock drills and local street plays on safety measures

58. The Ministry of Environment, Forest and Climate Change (MoEFCC) occasionally issues guidelines for managing HWC. What is the standard advice regarding crowds when a wild animal enters a human settlement?
(A) Keep bystanders at a distance to give the animal an unblocked escape path
(B) Assemble local residents to encircle the animal closely and block all potential exit points
(C) Encourage the crowd to hurl stones and make loud noises to force the animal into the woods
(D) Authorize community members to independently deploy capture nets to secure the animal

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59. Which technological device is frequently deployed by the forest department to track the movement patterns of a chronically problematic wild elephant?
(A) A microchip implanted in the tusk
(B) A GPS-enabled satellite radio collar
(C) A drone tethered to the elephant's leg
(D) An ankle bracelet with a bell

60. How do camera traps assist wildlife managers in resolving conflict incidents involving carnivores?
(A) They automatically fire pneumatic tranquiliser darts whenever motion sensors detect crossing animals
(B) They identify specific animals by coat patterns to ensure target capture
(C) They discharge high-intensity light flashes designed to permanently impair the vision of target carnivores
(D) They deploy automated mechanical barriers to physically obstruct moving big cats along forest trails

(D) To operate commercial wildlife safaris and conduct guided tourist excursions within core sanctuary zones

45. Given below are two statements, one labeled as Assertion (A) and the other labeled as Reason (R).
Assertion (A): Cultivating sugarcane near forest boundaries in the Terai region increases the likelihood of human-tiger conflict.
Reason (R): Sugarcane fields provide dense cover, mimicking the tall grasslands that tigers naturally use for resting and breeding, leading to unexpected encounters with farmers.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

46. The Uttar Pradesh Forest Department operates a dedicated 24x7 toll-free helpline number for public assistance regarding wildlife conflicts and forest crimes. What is this number?
(A) 100
(B) 1090
(C) 1926
(D) 1098

47. Which of the following represents a profound socio-economic impact of human-wildlife conflict on rural communities?
(A) A significant influx of foreign direct investment directed toward rural infrastructure projects
(B) Accelerated industrialization and conversion of traditional farming lands into manufacturing zones
(C) The total, permanent eradication of waterborne and vector-borne seasonal diseases in the region
(D) Reduced school attendance due to fear of wildlife encounters along forest roads

48. How does severe human-wildlife conflict affect the mental health of farmers living on forest fringes?
(A) It generates a persistent psychological state of euphoria associated with frequent animal encounters
(B) It eliminates mental health conditions by encouraging continuous outdoor physical activity among farmers
(C) It causes chronic anxiety, sleep loss from night guarding, and fear of life loss
(D) It produces zero measurable or documented psychological impact on rural forest-dwelling communities

49. The concept of "Human-Wildlife Coexistence" focuses primarily on:
(A) Eradicating all wild species from fringe areas to establish a guaranteed zero-risk environment for villagers
(B) Managing risks to foster sustainable landscape sharing between people and wildlife
(C) Mandating the complete relocation of human settlements situated within a hundred-kilometer sanctuary radius
(D) Applying genetic engineering techniques to render wild carnivores entirely herbivorous and docile in nature

50. Ecodevelopment Committees (EDCs) are typically formed in which zone to foster coexistence and reduce conflict?
(A) In the deepest, strictly protected core areas of national parks and tiger reserves
(B) Within densely populated urban municipal wards situated far from natural forests
(C) Across designated commercial industrial zones and manufacturing estates
(D) In fringe villages surrounding Protected Areas

51. Habitat fragmentation contributes to human-wildlife conflict by creating which of the following ecological effects?
(A) Expanded contact zones between forests and human-dominated landscapes
(B) The Allee effect, where reduced population density lowers individual fitness and breeding success rates
(C) The Greenhouse effect, where atmospheric heat trapping destabilizes regional weather patterns across biomes
(D) The Bottleneck effect, where sharp population declines restrict overall genetic diversity in future generations

52. Which district in Uttar Pradesh frequently reports incidents of human-leopard conflict owing to the fragmented forest patches and extensive sugarcane cultivation?
(A) Mathura
(B) Ghazipur

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69. Why is the translocating of problem leopards generally considered an ineffective long-term solution by wildlife biologists?
(A) Strong homing instincts drive them to travel back, sparking new conflicts along their path
(B) Big cats experience fatal physiological failure when removed from their native natal habitat
(C) Relocated big cats instantly suffer complete loss of natural predatory and hunting instincts
(D) Relocation triggers immediate psychological disorientation causing cats to vanish from the landscape

70. Consider the following statements regarding mitigation strategies:
I. Acoustic deterrents lose their effectiveness over time as animals habituate to the noise.
II. Solar fencing is only effective if local communities take ownership of its maintenance.
III. Ex-gratia payments solve the root cause of human-wildlife conflict.
IV. Corridor restoration requires inter-departmental coordination (e.g., Forest, Highways, Railways).
Which of the above statement(s) is/are correct?
(A) I, II, and III only
(B) II, III, and IV only
(C) I, II, and IV only
(D) I, III, and IV only

71. In Uttar Pradesh, what is the primary mandate of the 'Primary Response Teams' (PRT) formed at the village level?
(A) To evaluate applications and grant firearm possession permits directly to rural residents
(B) To engage locals, manage initial crowds, and alert the Forest Department
(C) To independently deploy darting equipment and tranquilize straying big cats without supervision
(D) To exercise statutory legal powers in prosecuting agriculturalists who install unauthorized fences

72. How does the practice of dumping poultry and slaughterhouse waste near village fringes contribute to human-wildlife conflict?
(A) It introduces toxic chemical compounds into topsoil, permanently reducing agricultural productivity
(B) Accumulated organic wastes undergo thermal reaction, igniting destructive forest fringe blazes
(C) It attracts scavengers like feral dogs, drawing apex predators near human habitations
(D) Chemical odors emanating from waste sites force native herbivore species to migrate far away

73. Which of the following is a traditional yet largely illegal method used by disgruntled villagers to retaliate against crop-raiding herbivores or cattle-lifting carnivores?
(A) Submitting formal Public Interest Litigation petitions directly before the Supreme Court of India
(B) Drafting official international diplomatic appeals urging United Nations bodies to intervene
(C) Constructing reinforced concrete watchtowers reaching twenty feet in height around farm borders
(D) Setting crude wire snares and deploying poisoned animal carcasses

74. The "Living with Leopards" public awareness program generally emphasizes which crucial behavioural change among villagers?
(A) Keeping children inside after dusk and illuminating village paths
(B) Organizing seasonal hunting drives to reduce regional leopard populations during winter
(C) Leaving domestic livestock untethered across open pastures at night to distract wild carnivores
(D) Cultivating dense vegetation and tall shrubs directly against residential house walls

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75. Match the wildlife reserves in List I with their primary geographical district in List II.
List I: (Wildlife Reserve)
P. Dudhwa National Park
Q. Pilibhit Tiger Reserve
R. Katerniaghat Wildlife Sanctuary
S. Ranipur Tiger Reserve
List II: (Primary District)
1. Bahraich
2. Lakhimpur Kheri
3. Chitrakoot
4. Pilibhit
(A) P-2, Q-4, R-1, S-3
(B) P-4, Q-2, R-3, S-1
(C) P-1, Q-3, R-2, S-4
(D) P-3, Q-1, R-4, S-2

61. Recent data on human-wildlife conflict in India highlights that the highest number of human fatalities are caused by which wild animal annually?
(A) Elephant
(B) Tiger
(C) Leopard
(D) Sloth Bear

62. What is the collaborative role of NGOs like Wildlife Trust of India (WTI) or WWF-India in managing HWC alongside the forest department?
(A) They assume statutory law enforcement duties to detain and prosecute suspected poachers
(B) They hold legal jurisdiction to grant wildlife culling permits directly to rural agriculturalists
(C) They offer technical guidance, RRT training, and community engagement support
(D) They supersede state forest departments and take complete operational command of conflict regions

63. Why is proper land-use planning essential for long-term human-wildlife conflict resolution?
(A) It facilitates the systematic reclassification of state forests into commercial development zones
(B) It legally mandates free-ranging wildlife to stay strictly within geometrically defined boundaries
(C) It enables unchecked urban expansion and industrial growth across remaining natural open spaces
(D) It restricts chaotic human development across vital wildlife corridors and habitats

64. In the context of conflict mitigation, what is meant by 'changing cropping patterns'?
(A) Arranging agricultural fields in alternating geometric zig-zag patterns to confuse animal navigation
(B) Scheduling crop harvesting activities exclusively during midnight hours to avoid animal interactions
(C) Switching from attractive crops like sugarcane to deterrent crops like lemongrass near borders
(D) Developing bio-luminescent crop varieties engineered to glow in dark conditions to scare wildlife

65. When wild boars cause extensive crop damage, what legal provision can the state government invoke to control their population temporarily?
(A) Officially grant the species protected status as a designated National Animal
(B) Classify them temporarily as 'Vermin' under WPA 1972 to allow localized culling
(C) Reclassify the species into Schedule I of the WPA 1972 to grant absolute legal immunity
(D) Authorize immediate translocation and export of problem populations to international destinations

66. A prominent cause of conflict involving Sloth Bears in the Vindhyan and Bundelkhand regions of Uttar Pradesh is:
(A) Sloth bears actively hunting and preying upon domestic livestock herds for meat consumption
(B) Bear populations routinely entering urban municipal centers to forage in open refuse landfills
(C) Bears entering residential towns to access drinking water from open municipal storage tanks
(D) Surprise encounters with locals gathering forest produce like Mahua and tendu leaves

67. Which of the following is NOT a recommended measure during a sudden encounter with a wild elephant?
(A) Charging at the elephant with bright lights to assert dominance
(B) Remaining fully quiet while refraining from making rapid or unpredictable body movements
(C) Retracting your steps gradually while keeping your face directed toward the animal at all times
(D) Ensuring the wild animal retains generous physical space and an unobstructed pathway to move away

68. The Amangarh Tiger Reserve in Uttar Pradesh, which witnesses significant wildlife movement and occasional conflict, acts as a buffer for which famous National Park?
(A) Dudhwa National Park
(B) Rajaji National Park
(C) Jim Corbett National Park
(D) Valmiki National Park

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(D) When wild herbivorous animals spontaneously develop predatory physiological traits to hunt live prey

85. Given below are two statements, one labeled as Assertion (A) and the other labeled as Reason (R).
Assertion (A): Cultivating highly palatable crops like maize and sugarcane directly adjacent to the boundary of a wildlife sanctuary is discouraged.
Reason (R): These crops act as strong attractants for wild herbivores and omnivores, leading to severe crop depredation and subsequent human-wildlife conflict.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

86. How does illegal hooking of high-tension electrical wires by farmers to protect crops affect wildlife?
(A) It produces zero physical impact because wild animal hides provide complete electrical insulation
(B) It generates mild electrostatic sensations that harmlessly turn animals back toward the forest
(C) It safely charges the natural biological energy levels of wildlife, inducing heightened activity
(D) It leads to fatal electrocution of megafauna and strict prosecution of offenders

87. Under the Project Elephant guidelines, what constitutes an "Elephant Corridor"?
(A) A major subterranean concrete transport passage built specifically for managed elephant herds
(B) A land strip connecting two larger habitats to facilitate seasonal movement
(C) A dedicated natural river segment utilized exclusively by wild megaherbivores for daily bathing
(D) A regulated government commercial trading facility where ivory products are legally exchanged

88. What is the impact of uncontrolled forest fires on human-wildlife conflict?
(A) Wildfires instantly elevate the dietary nutrient value of forest grass, eliminating straying behavior
(B) Wildfires convert primary forest ecosystems into arid desert biomes, ending human-animal interaction
(C) Fires destroy natural forage and habitat, driving wildlife into nearby settlements
(D) Forest blazes impact avian species exclusively, leaving terrestrial mammal populations unaffected

89. Which of the following is a non-lethal method employed by rapid response teams to safely drive a wild elephant herd away from a human settlement?
(A) Discharging lethal firearm ammunition directly into wild elephant groups to force retreat
(B) Releasing high-concentration toxic chemical gas canisters near animal aggregations
(C) Constructing deep, unlined pitfall traps directly across designated animal movement trails
(D) Using trained captive elephants (Kumkis) to guide the herd back to the forest

90. When designing an emergency protocol for tiger straying, what is the role of a 'holding center'?
(A) A temporary site for veterinary evaluation and monitoring before release decisions
(B) A commercial public viewing complex constructed to display captured animals for tourist amusement
(C) A government-sanctioned terminal facility designated for the processing of problem big cats
(D) A lifelong zoological caging facility intended to house all straying animals permanently

91. The success of a solar fence largely depends on its voltage and current characteristics. What is the standard electrical nature of a wildlife deterrent solar fence?
(A) Low voltage output combined with continuous, high-amperage electrical current flow
(B) High voltage (7000-9000V) with short, pulsating low current
(C) Unmodified standard 220V alternating current supplied continuously along wires
(D) Complete absence of electric potential, operating solely through electromagnetic fields

92. Why is 'weed eradication' inside protected areas linked to conflict mitigation?

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(A) Invasive weed species release toxic volatile compounds harmful to neighboring human populations
(B) Removing weeds restores native forage and prey, keeping animals within the forest
(C) Dense weed thickets physically entangle adult big cats, leading to widespread natural mortality
(D) Invasive floral weeds emit aromatic scents that attract wild elephant herds toward settlements

93. A major socio-economic repercussion of persistent human-wildlife conflict is 'opportunity cost'. What does this refer to in this context?
(A) Forgone income, time, and education spent on night field guarding
(B) Financial revenues generated by local residents through legal commercial sale of captured wild animals
(C) Statutory financial subsidies and agricultural development grants provided directly to local farming families
(D) Commercial operational profits accrued by non-governmental conservation organizations operating in the district

94. What does the term "Spillover Effect" mean in the context of Protected Area management and HWC?
(A) Sudden hydrological discharge from forest reservoir dams flooding adjacent rural settlements
(B) Cross-species transmission of infectious zoonotic pathogens from domestic livestock to wild fauna
(C) Population growth exceeding carrying capacity, forcing wildlife into nearby human landscapes
(D) Deciduous tree foliage loss occurring naturally across forest ecosystems during autumn seasons

95. Consider the following steps for managing a strayed leopard in a house:
I. Safe chemical immobilisation (tranquilisation) by a veterinarian
II. Crowd control and securing the perimeter by police/forest staff
III. Health assessment and transport in a secure cage
IV. Confirming the presence and exact location of the animal inside the structure
Which of the following is the correct logical sequence of the above steps?
(A) IV, II, I, III
(B) II, IV, I, III
(C) IV, I, II, III
(D) II, I, IV, III

96. What is the main reason why translocating conflict-causing Macaques (monkeys) from urban areas to deep forests often fails?
(A) Urban macaques lack physiological adaptations required to climb mature natural forest trees
(B) Relocated macaques are immediately preyed upon and eliminated by wild herbivorous forest species
(C) Habituation to human food impairs natural foraging, driving macaques back to towns
(D) Urban monkey populations suffer fatal physical degradation when exposed to heavy forest rainfall

97. The concept of "carrying capacity" of a forest habitat refers to:
(A) The physical load weight limit a field ranger is capable of transporting during forest patrols
(B) The maximum species population an environment can sustainably support with available resources
(C) The total daily quota of commercial safari vehicles permitted inside a protected sanctuary
(D) The annual volumetric quantity of timber resources legally cleared from forest compartments

98. How does proper garbage and solid waste management in towns adjacent to forests reduce human-leopard conflict?
(A) It creates smooth, uncluttered ground surfaces that facilitate leopard movement through towns
(B) Waste processing converts organic refuse into toxic chemical residues that repel big cat species
(C) Municipal sanitation workers execute routine armed patrols to deter big cats along town borders
(D) Removing waste dumps reduces feral prey numbers, keeping leopards away from towns

99. The "Hathi Mere Sathi" campaign launched by the MoEFCC primarily focused on:
(A) Spreading public awareness and welfare

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measures to promote human-elephant coexistence
(B) Executing targeted culling programs to eliminate wild elephant herds damaging agricultural crops
(C) Capturing wild megaherbivores for training as draft animals in commercial farming operations
(D) Facilitating the legalization and expansion of commercial international ivory trading networks

100. In evaluating wildlife damage compensation claims, why is an on-site inspection by a joint team of Revenue and Forest officials mandated?
(A) To subject rural claimants to formal administrative questioning and public humiliation
(B) To initiate immediate criminal proceedings against the affected landholder for farm negligence
(C) To verify actual crop damage and prevent fraudulent compensation claims
(D) To execute mandatory state acquisition of private agricultural property adjoining forest lands

101. What specific behaviour of sloth bears makes them highly dangerous during sudden encounters with humans?
(A) Limited sight and hearing cause sudden close encounters, triggering defensive attacks
(B) Sloth bears exhibit obligate carnivorous habits, actively hunting human beings for sustenance
(C) Sloth bears form structured social packs that execute coordinated group attacks on human settlements
(D) Sloth bears feature specialized epidermal glands that coat their sharp claws in deadly cardiotoxins

102. Which of the following is considered an indirect cost of human-wildlife conflict?
(A) Direct medical expenses incurred for treating severe physical injuries inflicted by wild animals
(B) Direct financial costs resulting from structural destruction of residential mud houses by elephants
(C) Monetary market loss calculated from the death of domestic cattle preyed upon by wild carnivores
(D) Psychological stress and reluctance to invest in farming due to crop raid fears

103. What is a "Buffer Zone" in the context of Tiger Reserves?
(A) The undisturbed sanctuary core where all forms of human entry and resource extraction are strictly banned
(B) A peripheral area supporting sustainable livelihoods and human-wildlife coexistence
(C) A designated regional manufacturing precinct reserved exclusively for heavy industrial activities
(D) Subterranean fortified bunker structures built to house forest protection personnel during emergencies

104. Which state agency in Uttar Pradesh bears the primary statutory responsibility for processing and disbursing compensation for wildlife-induced deaths and injuries?
(A) The State Police Department administrative office
(B) The Public Works Department district headquarters
(C) UP Forest Department
(D) The State Election Commission legal authority

105. Match the technologies in List I with their primary functions in List II.
List I: (Technology)
P. VHF Radio Collar
Q. Camera Trap
R. Drone (UAV)
S. Acoustic deterrent device
List II: (Primary Function)
1. Identifying individual animals through unique markings
2. Real-time telemetry tracking of animal movement
3. Emitting high-frequency sounds to keep animals away
4. Aerial surveillance of animal herds in thick vegetation
(A) P-2, Q-1, R-4, S-3
(B) P-1, Q-2, R-3, S-4
(C) P-4, Q-3, R-2, S-1
(D) P-3, Q-4, R-1, S-2

106. Why is the use of chemical pesticides in agricultural lands adjacent to forests a concern for wildlife conservation and conflict?
(A) Chemical runoff poisons non-target wildlife and disrupts ecosystem balance

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(A) Blackbuck antelope species
(B) Indian Rhinoceros species
(C) Asiatic Lion population
(D) Swamp Deer

138. How does proper compensation mechanism impact the "tolerance" of local communities towards wildlife?
(A) It buffers financial losses, preserving community tolerance toward wild species
(B) It significantly diminishes public tolerance by encouraging financial greed among farm owners
(C) It produces no measurable statistical influence on local tolerance levels toward big cats
(D) It creates permanent deterrence mechanisms that exclude wild animals from peripheral habitats

139. What is a "Drive Operation" in the context of elephant conflict management?
(A) Specialized behavioral training programs teaching captive elephants to drive tractor machinery
(B) A joint effort using noise, fire, or kumkis to herd elephants back into forest bounds
(C) An observational field survey protocol designed to count elephant herds from motorized vehicles
(D) Commercial statutory proceedings involving legal public auctions of captured problem elephants

140. Select the correct sequential order of spatial zones from the innermost protected area to the outermost human settlement in a standard Biosphere/Tiger Reserve model:
(A) Buffer Zone → Transition Zone → Core Zone
(B) Core Zone → Buffer Zone → Transition Zone
(C) Transition Zone → Core Zone → Buffer Zone
(D) Core Zone → Transition Zone → Buffer Zone

141. What is the fundamental ecological purpose of a 'Core Zone' in conflict mitigation?
(A) To provide undisturbed, resource-rich habitat where wildlife thrives without human disruption
(B) To function as a high-capacity commercial tourism resort equipped with intensive infrastructure
(C) To permit uninhibited, continuous grazing access for domestic livestock herds within the sanctuary
(D) To serve as an official municipal landfill for disposing of solid urban waste from nearby towns

142. The "Guwahati Declaration" or similar regional declarations on human-wildlife conflict emphasize:
(A) Implementing targeted culling policies to eliminate all native apex predator species nationwide by 2030
(B) Erecting continuous physical perimeter fencing around every protected forest boundary across India
(C) Treating HWC as a priority and adopting landscape-level coexistence approaches
(D) Transferring statutory ownership and operational control of all national parks to private corporations

143. Which of the following represents an innovative, community-based financial mechanism to handle livestock loss by predators?
(A) Detaining on-duty forest guards and confiscating statutory government salaries to reimburse farmers
(B) Executing commercial land sales transferring communal forest territories to foreign private entities
(C) Capturing target predators and assigning them to commercial entertainment circuses for profit
(D) Community insurance schemes where local premiums are matched by conservation NGOs

144. In UP's Dudhwa Tiger Reserve area, why is the local railway line a subject of major human-wildlife conflict discussions?
(A) Motorized railway trains experience frequent physical predatory attacks and damage from wild tiger packs
(B) Commercial passenger rail lines are systematically exploited to illicitly transport live elephants interstate
(C) Tracks bisect key corridors, causing fatal collisions with elephants and rhinos
(D) Wildlife species utilize railway lines as primary sleeping sites, completely terminating regional rail transport

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114. How does the 'edge effect' specifically alter the ecology of a forest boundary, making conflict more likely?
(A) It produces linear geographic boundaries that wild animal species instinctively refuse to traverse
(B) It induces complete vegetation mortality, leaving forest margins entirely barren of plant life
(C) It creates localized geomagnetic disturbances that disorient animal navigational instincts
(D) Sunlight boosts boundary vegetation, drawing herbivores and predators near villages

115. Consider the following statements regarding the translocation of conflict-causing wildlife:
I. It requires clearance from the Chief Wildlife Warden.
II. Translocation of carnivores is generally highly successful and guarantees they will settle in the new area peacefully.
III. The release site must have an adequate natural prey base and water supply.
Which of the above statement(s) is/are correct?
(A) I and II only
(B) I and III only
(C) II and III only
(D) I, II, and III

116. In Uttar Pradesh, which community heavily relies on pastoralism in and around the Terai forests, frequently facing livestock depredation by big cats?
(A) The Sentinelese islander group
(B) The Bhotiya Himalayan community
(C) Gujjar and Vantangiya groups
(D) The Toda Nilgiri pastoral group

117. What is the fundamental difference between a 'straying' incident and a regular 'conflict' incident?
(A) Straying is wandering without harm; conflict involves loss of life, injury, or crop damage
(B) Straying refers exclusively to deceased animals, whereas conflict denotes living animals in human areas
(C) Straying is a legal term reserved for plant-eating species, while conflict applies solely to carnivores
(D) Both terms are legally synonymous and used interchangeably under wildlife protection statutory codes

118. Which non-governmental organisation partners with the UP Forest Department to run the 'Terai Tiger Project' aimed at conflict mitigation?
(A) People for the Ethical Treatment of Animals
(B) Greenpeace International
(C) Amnesty International India
(D) WWF-India

119. A major limitation of using physical barricades like walls to stop wildlife is:
(A) Physical concrete barricades emit toxic chemical fumes that poison adjacent flora and fauna
(B) They block gene flow and migration routes, causing ecological harm
(C) Masonry walls are systematically consumed and digested by large wild herbivorous mammals
(D) Wall construction materials undergo thermal liquefaction during extreme Indian summer heat

120. In the context of HWC, what is the role of a 'mock drill' conducted by the Forest Department in sensitive villages?
(A) To conduct live-fire target practice exercises for rangers using stray animals as targets
(B) To assemble village crowds to verbally mock and physically intimidate approaching animals
(C) To train field staff and locals on emergency coordination and crowd control
(D) To provide public instruction on fabricating and installing illegal wire snares safely

121. The Indian Forest Act, 1927 primarily deals with which aspect that indirectly affects human-wildlife conflict?
(A) Regulating scientific research and mandatory genetic cloning of endangered native fauna
(B) Accelerating industrial expansion and commercial construction of urban concrete complexes
(C) Mandating state-sponsored culling and compulsory hunting of all wild carnivores in reserves
(D) Regulating forest laws, timber transit, and human access to habitats

122. Under the Forest Rights Act (FRA) 2006, how does the recognition of traditional rights impact human-wildlife coexistence?
(A) It grants forest dwellers rights to manage resources, promoting coexistence

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167. Which of the following describes a "Sink" area in a tiger landscape, often prone to conflict?
(A) Deep natural water bodies located in core forests where big cats regularly gather to bathe
(B) Marginal fringe habitats where mortality exceeds births, often occupied by transient tigers
(C) The strictly protected and heavily monitored innermost sanctum of a national tiger reserve
(D) Designated sanctuary locations where forest authorities provide supplemental feeding to wildlife

168. Consider the following statements regarding the use of Camera Traps in conflict areas:
I. They operate using passive infrared (PIR) sensors triggered by heat and motion.
II. They are ineffective at night and only capture images during daylight.
III. They are crucial for estimating the density of leopards in human-dominated landscapes.
Which of the above statement(s) is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

169. Consider the following statements regarding land-use planning around protected areas:
I. Eco-Sensitive Zones (ESZ) act as shock absorbers regulating industrial development near forests.
II. Unregulated mining in corridors disrupts wildlife movement, escalating conflict.
III. Constructing large resorts directly on the edge of the core zone is encouraged to deter wildlife.
IV. Linear infrastructure should ideally bypass critical wildlife habitats or incorporate underpasses.
Which of the above statement(s) is/are correct?
(A) I, II, and III only
(B) I, II, and IV only
(C) II, III, and IV only
(D) I, III, and IV only

170. Consider the following operational steps for radio-collaring a problem elephant:
I. Tracking the herd to identify the target individual
II. Releasing the elephant and initiating satellite monitoring
III. Chemically immobilizing (darting) the target elephant
IV. Fitting the GPS collar and reviving the animal with an antidote
Which of the following is the correct sequential order of the above steps?
(A) I, II, III, IV
(B) III, I, IV, II
(C) I, III, IV, II
(D) III, IV, I, II

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(C) Large carnivore species enrich agricultural soil quality through natural metabolic waste production
(D) Big cat presence deters municipal tax collectors from visiting remote agricultural farming villages

130. What is a "Chaff Cutter" (chara machine) and how is it related to human-leopard conflict in rural UP?
(A) A specialized biological adaptation big cats use to sever thick forest vegetation along trails
(B) An industrial processing device utilized by poachers to crush tiger skeletal remains illegally
(C) A motorized transport vehicle operated by forest protection staff during emergency field patrols
(D) A fodder-cutting tool in dark sheds where people gather feed, creating leopard ambush risks

131. In terms of public awareness, what advice is given to villagers to prevent snakebites, which is a major, yet often overlooked, form of human-wildlife conflict?
(A) Carry lights and sticks at night, and clear clutter and rodents around homes
(B) Walk completely barefoot along unlit rural paths to feel ground vibrations from approaching reptiles
(C) Place containers filled with fresh milk around residential doorways to appease native snake species
(D) Operate high-volume acoustic sound systems continuously throughout the night to repel wild reptiles

132. The "India State of Forest Report" (ISFR) is released biennially. Why is monitoring the 'Open Forest' and 'Scrub' categories important for HWC?
(A) Closed dense canopy forest covers have experienced total scientific extinction across the state
(B) Arid scrub habitats represent the exclusive ecological environments where wild elephants breed
(C) Degradation in these buffer zones bordering settlements drives wildlife into farmlands
(D) Open canopy forest areas fall entirely under private corporate ownership and commercial logging

133. Which Ramsar wetland site in Uttar Pradesh is noted for significant avian wildlife which sometimes causes localized agricultural conflicts (crop depredation by migratory birds)?
(A) Nawabganj Sanctuary
(B) Chilika Lake Wetland Reserve
(C) Keoladeo National Park Site
(D) Loktak Lake Freshwater Basin

134. What is the primary focus of 'Project Elephant' launched by the Government of India in 1992?
(A) To develop commercial urban elephant tourism initiatives across major metropolitan centers
(B) To facilitate international export of native Asian elephants to African national reserves
(C) To execute systematic capture drives targeting all wild elephant herds for farm domestication
(D) To support state efforts in managing wild elephants, mitigating conflict, and protecting corridors

135. Consider the following statements regarding the socio-economic impacts of human-wildlife conflict:
I. It leads to food insecurity due to crop destruction.
II. It increases the workload on women who must spend extra hours guarding fields.
III. It results in positive economic growth by increasing insurance payouts.
IV. It fosters resentment against the Forest Department, hindering conservation efforts.
Which of the above statement(s) is/are correct?
(A) I, II, and III only
(B) I, II, and IV only
(C) II, III, and IV only
(D) I, III, and IV only

136. The Wildlife (Protection) Act, 1972 classifies wild animals into different Schedules. Which Schedule affords the absolute highest legal protection, drawing maximum penalties for poaching or illegal hunting?
(A) Schedule V
(B) Schedule III
(C) Schedule I
(D) Schedule IV

137. The State Animal of Uttar Pradesh, which is highly protected under Schedule I of the Wildlife (Protection) Act, 1972, and is a crucial part of the Terai ecosystem, is:

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(B) It grants indigenous populations legal authorization to hunt big cats for commercial trade
(C) It mandates the immediate, compulsory eviction of all traditional forest dwellers from reserves
(D) It dissolves state forest departments and transfers law enforcement to local village militias

123. The National Tiger Conservation Authority (NTCA) has a strict Standard Operating Procedure (SOP) for dealing with tigers straying into human dominated landscapes. Which action is strictly PROHIBITED as a first response under this SOP?
(A) Formally notifying local district administrative authorities to coordinate emergency logistics
(B) Instantly shooting the tiger without assessing behavior or attempting capture
(C) Installing automated infrared camera traps to monitor animal movement along village perimeters
(D) Dispatching specialized veterinary teams equipped for potential chemical capture operations

124. The term "anthropogenic food subsidy" in the context of wildlife conflict refers to:
(A) Statutory food ration allowances provided by the government to on-duty forest guard personnel
(B) Human food sources like garbage and crops that sustain wildlife near human areas
(C) Naturally occurring grasses and wild forage expanding across core national park sanctuaries
(D) Commercially prepared dietary provisions fed directly to captive wild animals in urban zoos

125. Given below are two statements, one labeled as Assertion (A) and the other labeled as Reason (R).
Assertion (A): Establishing strong relationships and trust between the Forest Department and local communities is vital for effective HWC management.
Reason (R): If locals distrust the department, they are more likely to hide information, hinder rescue operations, and resort to secretive retaliatory killings of wildlife.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

126. Which traditional practice in rural Uttar Pradesh heavily relies on accessing deep forest areas, making individuals vulnerable to tiger/leopard attacks?
(A) Commercial deep sea fishing operations
(B) Information technology park development
(C) Gathering forest produce like dry wood and honey
(D) Subterranean commercial coal mining activities

127. Why are modern highways constructed through wildlife corridors required to have noise barriers and light screens?
(A) To obstruct vehicle passengers from taking photographs of wild animals passing along highway borders
(B) To visually enhance and aesthetically beautify highway corridors passing through state forests
(C) To prevent forest animals from detecting auditory sound disturbances caused by natural rainfall
(D) To reduce noise and headlight glare, encouraging animals to use underpasses

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128. What constitutes a "Problem Animal"?
(A) Any wild creature residing naturally within undisturbed core forest zones away from human habitations
(B) Captive wild specimens that consistently display unwillingness to participate in breeding programs
(C) An individual animal repeatedly damaging property, preying on livestock, or posing human threats
(D) Free-ranging herbivorous mammals that consume wild grass species within designated sanctuary boundaries

129. How does the presence of intact, healthy predator populations (like tigers and leopards) in a forest naturally assist local farmers?
(A) Predators directly assist farming communities in harvesting mature agricultural crops efficiently
(B) They control crop-raiding herbivore populations, preserving balance

145. Match the conflict zones in List I with their predominantly associated wildlife species in List II.

List I: (Conflict Zone)

P. Shivalik foothills (Saharanpur)
Q. Terai sugarcane belt (Pilibhit)
R. Bundelkhand rocky terrain (Mahoba/ Lalitpur)
S. General agricultural plains

List II: (Associated Wildlife Species)

1. Sloth Bear
2. Elephant
3. Nilgai / Blue Bull
4. Tiger / Leopard

(A) P-2, Q-4, R-1, S-3
(B) P-4, Q-2, R-3, S-1
(C) P-1, Q-3, R-2, S-4
(D) P-3, Q-1, R-4, S-2

146. A wild animal is categorized as "Man-eater" only when:
(A) It is observed scavenging upon human skeletal remains or deceased bodies within village burial sites
(B) It inflicts accidental fatal injuries on a human who unexpectedly stumbles upon its hiding spot in thickets
(C) It exhibits vocal territorial defense and growls at safari vehicle passengers or patrolling rangers
(D) It systematically hunts and consumes humans as primary prey due to disability or altered behavior

147. Why are 'snares' set by farmers for wild boars considered a devastating threat to big cats?
(A) Snares kill indiscriminately, causing severe injuries or death to big cats that enter them
(B) Big cats interact playfully with deployed wire snares, accidentally ingesting metal components with fatal results
(C) Wire snares possess specialized magnetic mechanisms engineered to selectively capture only adult tiger species
(D) Big cats experience severe allergic physiological reactions upon coming into physical contact with snare wire

148. Which department is responsible for maintaining the health and veterinary care of wild animals rescued from conflict situations in Uttar Pradesh?
(A) Department of Health and Family Welfare administration
(B) The State Police Medical Wing enforcement branch
(C) Animal Husbandry and Forest Departments jointly
(D) The Ministry of Earth Sciences research division

149. What does the "One Health" approach mean in the context of human-wildlife interactions?
(A) Integrating human, animal, and ecosystem health to address zoonotic disease risks in conflict zones
(B) Implementing medical health policies designed exclusively to benefit human populations in urban districts
(C) Allocating a single standardized commercial health insurance coverage policy per rural administrative village
(D) Establishing government programs dedicated solely to supplying nutritional multivitamin supplements to big cats

150. Consider the following statements regarding Section 11 of the Wildlife (Protection) Act, 1972:
I. It allows the Chief Wildlife Warden to permit hunting of a Schedule I animal if it becomes dangerous to human life.
II. Before ordering the killing, the authority must be satisfied that the animal cannot be captured, tranquilised, or translocated.
III. It grants complete immunity to poachers if they claim self-defense after tracking an animal.
IV. Any animal killed under this section becomes government property.

Which of the above statement(s) is/are correct?
(A) I, II, and III only
(B) I, II, and IV only
(C) II, III, and IV only
(D) I, III, and IV only

151. What is the role of a 'Squeeze Cage' in conflict mitigation?
(A) A heavy mechanical crushing structure engineered to lethally dispatch captured problem wild animals
(B) A cage with movable walls to safely restrain wild animals for veterinary care without anesthesia
(C) Specialized avian trapping equipment configured to catch multiple wild bird species simultaneously
(D) Reinforced metal storage enclosures built by farming communities to protect harvested cereal crops

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152. In tiger conservation landscapes, what is a "choke point"?
(A) A depleted atmospheric zone where low ambient oxygen concentrations impede wild animal respiration
(B) A specialized physical defensive tactic employed by ranger personnel during close animal encounters
(C) A narrowed corridor section surrounded by human activity, making passage risky and conflict-prone
(D) An aquatic freshwater body completely covered by dense mats of invasive water hyacinth vegetation

153. Why is the 'fringe village' community considered a critical stakeholder in conservation?
(A) They represent the primary commercial market purchasers of illegal timber harvested from state forests
(B) They hold direct statutory legal ownership titles over the entire territorial extent of national parks
(C) They are granted exclusive legal permits to engage in seasonal hunting activities within core zones
(D) They bear direct costs like crop and livestock losses while receiving limited direct benefits

154. What is the primary ecological risk of releasing a captured conflict-leopard into an unfamiliar, already saturated forest reserve?
(A) Territorial fights with resident leopards may injure the cat or drive it into nearby villages
(B) Relocation induces severe dietary shifts causing big cats to consume natural forest foliage exclusively
(C) Translocated individuals establish immediate social dominance over existing resident leopard populations
(D) Relocated big cats experience extreme confinement stress, refusing to exit structural transport cages

155. Consider the following statements regarding self-defense against wild animals under the law:
I. Killing a wild animal in absolute defense of oneself or another person is not an offence under the WPA 1972.
II. The right of self-defense applies even if the person was committing an illegal act (like poaching) when attacked.
III. The burden of proof that the killing was strictly for self-defense lies on the person who killed the animal.
Which of the above statement(s) is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

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156. In managing conflict, what is "Aversive Conditioning"?
(A) Conditioning wild animal species to perform entertainment behaviors for commercial tourism shows
(B) Using negative stimuli like loud noise or chili spray to teach animals to avoid human areas
(C) Manipulating local meteorological conditions to retain wild animal populations within forest bounds
(D) Training rural agricultural communities to tolerate wildlife crop damage without seeking compensation

157. Which crop is most notoriously associated with attracting wild boars in Uttar Pradesh?
(A) Groundnut crops
(B) Fresh mint plantations
(C) Commercial eucalyptus trees
(D) Raw agricultural cotton

158. The 'National Wildlife Action Plan (NWAP)' outlines strategies for HWC. Which NWAP is currently operational in India?
(A) NWAP (1983-2001)
(B) NWAP (2002-2016)
(C) NWAP (2017-2031)
(D) NWAP (2032-2045)

159. What is the fundamental principle of 'Landscape Level Planning' in mitigating human-wildlife conflict?
(A) Directing all management resources exclusively toward the core area of an isolated national park
(B) Transforming natural forest ecosystems into artificially manicured botanical landscape gardens
(C) Constructing high security perimeter walls around all rural villages situated across the state
(D) Coordinating conservation across forests, farmlands, and settlements to preserve connectivity

160. How does the promotion of ecotourism in buffer zones help mitigate human-wildlife conflict?

(A) Visiting tourist groups physically intimidate and frighten wild animals away from fringe villages
(B) Commercial safari vehicles are intentionally deployed to collide with and eliminate problem big cats
(C) It provides alternative income for locals, linking wildlife presence to economic gains
(D) Tourists supply supplemental food items that satisfy the nutritional requirements of wild carnivores

161. A leopard is spotted resting high up in a tree within a densely populated city. What is the most appropriate initial management strategy?
(A) Direct municipal emergency workers to immediately chop down the roosting tree structure
(B) Disperse crowds, maintain a quiet perimeter, and let the animal descend naturally at dusk
(C) Instruct bystanders to throw stones to force the animal to jump to the ground immediately
(D) Ignite large open fires directly around the tree base to smoke the big cat out of the canopy

162. Match the national guidelines and advisories in List I with their primary target in List II.
List I: (Guideline / Advisory)
P. NTCA SOPs
Q. Project Elephant Guidelines
R. MoEFCC Advisory on Human-Wildlife Conflict
S. WII Technical Manuals
List II: (Primary Target)
1. Mitigating crop raiding and safeguarding corridors
2. Managing straying tigers and dealing with man-eaters
3. Standardising tranquilisation and rescue protocols
4. Empowering Gram Panchayats and streamlining compensation
(A) P-2, Q-1, R-4, S-3
(B) P-1, Q-2, R-3, S-4
(C) P-4, Q-3, R-2, S-1
(D) P-3, Q-4, R-1, S-2

163. The term "Depredation" in wildlife management literature specifically refers to:
(A) Wild animals preying on livestock or destroying crops
(B) The gradual natural decomposition of fallen forest trees
(C) The annual seasonal shedding of antler structures by cervids
(D) The complex courtship and mating behaviors of wild big cats

164. What is the primary reason drones (Unmanned Aerial Vehicles) are becoming essential in conflict management?
(A) They are deployed to remotely discharge chemical tranquiliser darts into big cats from above
(B) They are equipped with heavy-lift machinery to transport wild elephants across sanctuaries
(C) They offer real-time aerial monitoring of animals in dense crops without ranger risk
(D) They emit electromagnetic energy fields designed to temporarily neutralize predator instincts

165. Given below are two statements, one labeled as Assertion (A) and the other labeled as Reason (R).
Assertion (A): Educating children in fringe villages about wildlife behaviour is a long-term strategy for conflict mitigation.
Reason (R): Children are often the most vulnerable to attacks during dawn and dusk; understanding animal behaviour helps them avoid high-risk situations and fosters future conservation ethos.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

166. Why is identifying a problem tiger precisely via camera traps mandatory before taking extreme steps like elimination?
(A) To ensure state forest archives maintain high-resolution photographic records of target animals
(B) To evaluate the commercial monetary value of the animal's pelt prior to legal authorization
(C) To scientifically verify whether the target big cat is native to the reserve or translocated
(D) To avoid killing non-target tigers, which harms ecosystems and leaves the problem unresolved

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(B) Chemical treatments render agricultural plants fully unpalatable and invulnerable to megaherbivores
(C) Agricultural sprays discharge specialized auditory frequencies that severely agitate local carnivores
(D) Chemical vapor emissions cause immediate thermal defoliation across adjacent protected forest canopies

107. Which demographic of rural communities is most vulnerable to human-wildlife conflict?
(A) Wealthy absentee agricultural landholders residing permanently in urban metropolitan centers
(B) Marginalized fringe farmers and herders lacking resources for mitigation
(C) Industrial manufacturing employees working inside metropolitan commercial districts
(D) High-ranking civil service bureaucrats stationed within administrative capital offices

108. In conflict prone areas, 'stall feeding' of cattle is encouraged over 'open grazing'. Why?
(A) Enclosed stall feeding alters domestic livestock chemistry, rendering meat unpalatable to big cats
(B) It keeps cattle out of forests, preserving herbivore forage and preventing predation
(C) Controlled stall nutrition accelerates defensive horn development in cattle, enabling self-protection
(D) Free-range open grazing is subject to an absolute statutory prohibition across all Indian territories

109. Which drug is most commonly used in India by wildlife veterinarians for the darting and chemical immobilization of large carnivores like tigers and leopards?
(A) Xylazine-Ketamine mixture
(B) Paracetamol analgesic medication
(C) Penicillin antibiotic formulation
(D) Chloroform anesthetic chemical

110. How do developmental projects like dams and reservoirs contribute to human-wildlife conflict?
(A) Reservoir construction creates surplus water bodies that induce behavioral lethargy in native species
(B) Hydroelectric power generation stations release direct electrical currents into surrounding habitats
(C) Submerging prime forests forces displaced wildlife into surrounding human areas
(D) Large dam projects completely obstruct animal access to natural freshwater aquatic ecosystems

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111. What is the main characteristic of a 'Transition Zone' in the Biosphere Reserve concept, relevant to HWC?
(A) It is an isolated zone strictly off-limits to all human presence and activity
(B) It is a designated military training ground reserved exclusively for tactical defense operations
(C) It is an ecologically devoid zone where environmental conditions prevent wild animal survival
(D) The outer area where management and locals collaborate on sustainable development

112. Why does the Forest Department discourage the rescue of seemingly "abandoned" leopard cubs found in sugarcane fields by villagers?
(A) Neonatal leopard cubs secrete dermal toxins that cause immediate contact poisoning in humans
(B) Young cubs display instinctual predatory aggression, launching immediate attacks on handling villagers
(C) Mothers leave cubs temporarily while hunting; human removal disrupts natural rearing
(D) Wildlife authorities maintain policy mandates requiring abandoned young to succumb to natural causes

113. If a leopard cub is inadvertently picked up by farmers, what is the immediate standard operating procedure followed by the Forest Department?
(A) Transport the cub to a government zoological facility located in an adjacent state without delay
(B) Monitor a nighttime reunion attempt by returning the cub to its exact site
(C) Perform immediate lethal euthanasia on the cub to eliminate future human-wildlife safety risks
(D) Transfer ownership of the cub to private collectors through authorized exotic pet auctions

ANSWERS

1. (B) Any interaction between humans and wildlife that results in negative impacts on human social, economic, or cultural life, on the conservation of wildlife populations, or on the environment
Human-wildlife conflict encompasses any interaction between humans and wild animals that leads to adverse outcomes. These negative impacts can affect human society, economic stability, or cultural life. Simultaneously, such encounters pose significant threats to wildlife population conservation and overall environmental stability, making comprehensive management strategies essential across shared fringe habitats.

2. (D) Human population expansion leading to habitat encroachment and fragmentation
Human population expansion is the leading anthropogenic cause driving the global rise in human-wildlife conflict. As human populations expand rapidly, natural forest ecosystems are cleared and fragmented for agriculture, housing, and industrial development. This relentless spatial encroachment reduces natural wildlife habitats, forcing wild animals to navigate human-dominated landscapes to satisfy basic ecological needs.

3. (A) Slash-and-burn shifting agriculture extending into buffer zones
Slash-and-burn shifting agriculture extending into forest buffer zones severely exacerbates human-wildlife conflict. Clearing native forest patches through fire destabilizes delicate fringe ecosystems and destroys natural forage resources. Consequently, wild animals are forced onto cleared agricultural lands to feed on cultivated crops, drastically increasing destructive crop-raiding incidents and negative encounters with local farming communities.

4. (C) Habitat fragmentation leading to increased edge effects and wildlife venturing into human settlements
Constructing linear infrastructure like highways and railways through contiguous forests causes severe habitat fragmentation. Dividing natural habitats creates high-density edge effects and disrupts traditional wildlife movement corridors. As a result, wild animals frequently stray outside fragmented forest boundaries into human settlements, leading to increased vehicular collisions, crop depredation, and direct encounters with people.

NODIA

5. (A) Carnivores enter human habitations to prey on domestic livestock and dogs
The depletion of natural prey species within protected forest areas directly alters the hunting behavior of large carnivores. Faced with severe nutritional deficits inside degraded habitats, predators like tigers and leopards venture outside reserve boundaries. They target easily accessible domestic livestock and dogs grazing near villages, resulting in heightened livestock depredation and human-carnivore conflict.

6. (D) They damage agricultural crops in large herds within human-dominated farming landscapes
Nilgai, or blue bulls, frequently cause major human-wildlife conflict across Uttar Pradesh due to their feeding habits in agricultural landscapes. These large herbivores form sizable herds that venture out of degraded forest patches into agricultural fields. They destroy extensive standing crops through grazing and trampling, inflicting severe financial losses on local farming communities.

7. (B) Leaving untethered cattle overnight at forest fringes after grazing in protected areas
Leaving cattle untethered overnight along forest fringes after daytime grazing severely increases their vulnerability to leopard attacks. Leopards are opportunistic, nocturnal predators that actively hunt along forest margins. Free-ranging or poorly sheltered livestock provide an easy food source, encouraging big cats to frequent human settlements and increasing the probability of human-leopard conflict.

8. (C) Staying overnight in elevated watchtowers (machaans) to scare away crop-raiding animals
Traditional crop guarding involves farmers staying overnight in elevated watchtowers, known as machaans, erected within or near agricultural fields. From these elevated structures, farmers remain vigilant during peak nocturnal activity

44. (B) To serve as local volunteers tracking big cats, spreading awareness, and managing crowds
Bagh Mitras are trained local community volunteers deployed around tiger reserves in Uttar Pradesh to assist forest authorities in conflict management. These volunteers actively track big cat movements, spread conservation awareness among residents, and assist in managing village crowds during animal straying incidents, fostering safer coexistence between communities and wildlife along reserve boundaries.

45. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Cultivating sugarcane near forest boundaries in the Terai region heavily increases human-tiger conflict because standing crops mimic natural tall grassland habitats. Tigers utilize these dense agricultural fields for resting, stalking prey, and raising cubs. Farmers entering their fields unexpectedly come into close contact with concealed big cats, resulting in dangerous defensive attacks and frequent fatalities.

46. (C) 1926
The Uttar Pradesh Forest Department operates a dedicated 24x7 toll-free helpline number, 1926, to assist citizens with wildlife emergencies and forest crimes. This centralized helpline allows residents to report animal straying, illegal poaching, forest fires, or habitat degradation, enabling swift operational deployment of rapid response teams to mitigate conflicts and enforce wildlife protection laws.

47. (D) Reduced school attendance due to fear of wildlife encounters along forest roads
Persistent human-wildlife conflict severely impacts rural community social dynamics, notably reducing school attendance among children living near forest boundaries. Parents frequently keep children at home due to intense fear of encounters with wild animals like elephants, tigers, or leopards along unlit rural roads, compromising educational access and long-term youth development in fringe villages.

48. (C) It causes chronic anxiety, sleep loss from night guarding, and fear of life loss
Continuous human-wildlife conflict severely affects the mental health of rural farming communities residing along forest margins. Farmers experience chronic psychological stress and persistent anxiety over potential crop destruction or sudden life-threatening attacks. Furthermore, mandatory overnight crop guarding in watchtowers causes severe sleep deprivation, worsening psychological strain and reducing overall community well-being.

49. (B) Managing risks to foster sustainable landscape sharing between people and wildlife
Human-wildlife coexistence focuses on developing sustainable management strategies that minimize conflict risks while enabling humans and wild species to share landscapes safely. Rather than seeking total animal eradication or human displacement, coexistence emphasizes risk mitigation, community engagement, habitat preservation, and effective land-use planning to balance ecological conservation with local socio-economic livelihood needs.

50. (D) In fringe villages surrounding Protected Areas
Ecodevelopment Committees are established in fringe villages surrounding Protected Areas to foster local participation in natural resource management. These committees implement sustainable livelihood initiatives, reduce rural community dependence on core forest resources, and build local capacity for conflict mitigation, ultimately encouraging collaborative conservation efforts and peaceful human-wildlife coexistence along reserve boundaries.

51. (A) Expanded contact zones between forests and human-dominated landscapes
Habitat fragmentation breaks large continuous forests into isolated patches, significantly expanding contact zones between wild habitats and human-dominated landscapes. As forest perimeters increase relative to total core area, wild animals are forced to cross human infrastructure, agricultural fields, and villages to access resources, driving up the frequency of negative encounters and human-wildlife conflict.

52. (C) Bijnor
Bijnor district in Uttar Pradesh frequently records high levels of human-leopard conflict due to its unique landscape composition. Fragmented forest patches intermingled with dense, extensive sugarcane cultivation create ideal shelter for leopards outside protected reserves. This agricultural setup brings big cats into continuous close proximity with farming communities, leading to frequent encounters and attacks.

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compromised big cats out of undisturbed core habitats. Driven to marginal fringe zones, these individuals target vulnerable domestic livestock or humans due to diminished hunting capability.

18. (D) Dawn, dusk, and night hours when leopards are naturally active
Human-leopard conflict near forest fringes predominantly occurs during dawn, dusk, and nighttime hours. Leopards are naturally crepuscular and nocturnal predators that utilize low light conditions to stalk prey and navigate fringe habitats undetected. During these periods, human visibility is reduced while animal activity peaks, increasing the probability of unexpected encounters around rural habitations.

19. (A) Transient tigers forced into marginal fringe habitats where conflict risks are high
A sink population in tiger ecology refers to transient or displaced individuals pushed into sub-optimal fringe habitats outside protected reserves. These marginal areas lack adequate natural prey and cover, resulting in high mortality rates that exceed local reproduction. Tigers inhabiting sink landscapes frequently encounter human settlements, significantly escalating livestock predation and direct conflict risks.

20. (C) I and III only
Wildlife corridors facilitate vital genetic exchange between isolated animal populations, maintaining ecological health. When human infrastructure like canals and highways breaks these natural movement pathways, migratory species are forced to traverse human-dominated landscapes. This disruption significantly increases human-wildlife encounters, leading to crop damage, vehicular collisions, and heightened conflict along fragmented migration routes.

21. (A) Constructing eco-bridges (overpasses) and animal underpasses
Eco-bridges and animal underpasses are crucial structural interventions implemented along major highways passing through forest landscapes. These specialized wildlife crossings maintain ecological connectivity across fragmented habitats without disturbing vehicle flow. By enabling safe movement for wild animals above or beneath busy road surfaces, these structures significantly mitigate wildlife roadkill and corridor fragmentation.

22. (D) Drying up forest water holes, driving wildlife into villages for water
Climate change alters regional precipitation patterns, increasing the frequency and intensity of severe droughts. Prolonged dry spells cause natural water holes and seasonal streams inside protected forest reserves to dry up completely. Deprived of essential water sources, wild animals are forced to exit their forest habitats and venture into nearby villages seeking liquid water.

23. (B) Scarcity of wild fruits leads bears and omnivores to raid crops and orchards
Climate-driven shifts in plant phenology alter the natural timing of fruiting and flowering across forest ecosystems. When wild trees and plants fail to produce expected seasonal yields, foraging wild animals face severe food shortages within protected areas. This scarcity forces omnivorous and herbivorous species, including bears, to venture into agricultural fields and fruit orchards.

24. (C) Reducing native forage, forcing herbivores into farmland for food
Invasive alien plants like Lantana camara aggressively outcompete native vegetation, forming dense monocultures across forest understories. This biological invasion severely reduces the growth of palatable native grasses and forage plants required by wild herbivores. Starved of adequate food within protected areas, herbivorous animals are forced to exit forests and raid surrounding agricultural crops.

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25. (D) Planting deterrent crops like chili, ginger, and tobacco on forest fringes
Planting non-palatable deterrent crops such as chili, ginger, and tobacco along forest boundaries serves as an effective biological mitigation strategy against crop raiding. Wild elephants find these specific plants unappealing due to pungent chemical compounds and strong tastes. Creating buffer strips of deterrent crops discourages herds from penetrating further into farmlands without causing physical harm.

26. (A) To physically prevent elephants from entering crop fields from the forest
Elephant Proof Trenches are mechanical barriers excavated along forest boundaries to physically prevent wild elephants from crossing into agricultural fields. The deep vertical walls and steep dimensions prevent large megaherbivores

hours. They actively use noise, spotlights, and vocal shouts to deter and drive away crop-raiding wild animals before significant agricultural damage can take place.

9. (D) Feral Dogs
Feral dogs are not classified as wild fauna under the Wildlife Protection Act of 1972, yet they represent a significant driver of conflict in rural landscapes. Packs of free-ranging feral dogs frequently prey on domestic livestock and harass wild herbivores. Additionally, they attract large carnivores like leopards to human habitations, increasing human-predator encounters.

10. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Human encroachment into forest buffer zones directly increases human-wildlife conflict by shrinking the physical distance between settlements and wild habitats. As human activities expand into ecological buffer areas, natural spatial barriers disappear. Both humans and wild animals are forced to share overlapping spaces, intensifying competition for land, water, and vegetation resources along boundaries.

11. (B) Crops provide higher nutritional value and palatability than wild forest forage
Wild elephants are highly attracted to agricultural crops like paddy and sugarcane because cultivated plants offer vastly superior nutritional value and palatability compared to wild forest forage. Crops are rich in sugars, minerals, and moisture, making crop raiding an energy-efficient foraging strategy that drives elephants to venture into agricultural fields despite risks.

12. (B) The Shivalik foothills and Terai region
Human-elephant conflict in Uttar Pradesh is historically concentrated in the Shivalik foothills and the Terai region. This geographic belt forms a vital ecological corridor connecting contiguous forest patches across Northern India. Heavy agricultural development, human settlement expansion, and seasonal movement of wild elephant herds through this fragmented landscape frequently spark intense conflict incidents.

13. (A) Brewed Mahua liquor
Brewed Mahua liquor possesses a distinct and powerful fermentation odor that strongly attracts wild elephants from considerable distances. Elephants possess an exceptional sense of smell and actively seek out alcohol sources stored in rural households. Searching for Mahua liquor often leads elephant herds directly into human habitations, resulting in severe structural damage to homes.

14. (C) Higher energy needs to sustain musth and enhance reproductive success
Adult male elephants undergo periodic physiological conditions known as musth, during which testosterone levels surge dramatically. This state demands high energy intake to sustain physical condition and enhance reproductive success during competitive breeding encounters. Consequently, lone bull elephants display heightened risk-taking behavior, frequently raiding nutrient-rich agricultural crops near villages to satisfy elevated metabolic demands.

15. (B) Shouting and beating drums → Lighting fire torches (mashals) → Throwing chili smoke → Calling forest department for tranquilisation
Managing crop-raiding elephants typically follows a progressive escalation of non-lethal deterrent techniques. Villagers first attempt low-intensity measures like shouting and beating drums to scare approaching herds. If ineffective, they escalate to lighting fire torches and releasing chili smoke. When physical deterrence fails completely, community members notify forest authorities to initiate professional tranquilization and translocation procedures.

16. (C) Sugarcane provides dense structural cover similar to tall grass for hiding and breeding
In the Terai Arc Landscape, mature sugarcane fields grow tall and dense, providing physical structural cover that closely mimics native tall grassland ecosystems. Female leopards frequently use these standing crops as secure, concealed spaces for resting and birthing cubs. This close proximity to agricultural activities leads to sudden, accidental encounters with working farmers.

17. (B) The tiger is old, injured, or displaced from core habitats by stronger rivals
Spikes in human-tiger conflict involving specific individuals typically occur when tigers become physically compromised or ecologically displaced. Incapacitating injuries, old age, or territorial expulsion by younger, dominant rivals force

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animal behaviors. Beehive fences deter elephants due to their natural fear of bee stings. Predator-proof night shelters protect domestic livestock from big cats like leopards and tigers. Flashing fox lights startle nocturnal carnivores, while chili smoke acts as an effective olfactory deterrent against crop-raiders.

36. (C) Clearing vegetation near wires to avoid power loss
Maintaining maximum voltage across solar-powered electric fences requires continuous clearing of surrounding vegetation along the wire perimeter. Overgrowing grass, weeds, or touching tree branches cause electrical grounding, leading to significant power loss along the circuit. Regular clearing prevents current leakage, ensuring the fence delivers an effective non-lethal shock whenever wild animals make physical contact.

37. (A) They detect animal heat and movement, sending immediate alerts to officials
Infrared sensors in early warning systems function by detecting thermal signatures and physical movement of wild animals near boundary lines. Upon detecting animal heat radiation, the integrated system automatically triggers real-time alerts, sending instant notifications to forest department officials and local villagers. This rapid warning allows response teams to intercept straying wildlife before conflict occurs.

38. (D) Forest officials broadcast bulk SMS and messaging alerts about herd locations to locals
Modern cellular technology is utilized in Uttar Pradesh to broadcast bulk SMS and instant messaging alerts regarding wild elephant herd movements. Field staff monitor elephant locations and send real-time notifications to residents in nearby villages. These early warnings enable local communities to take precautionary measures, clear movement pathways, and avoid dangerous nocturnal encounters with herds.

39. (B) To quickly arrive at conflict sites, control crowds, and protect people and wildlife
Rapid Response Teams are specialized units trained by the Forest Department to handle human-wildlife emergency situations promptly. Upon receiving reports of animal straying or conflict, these teams deploy quickly to manage crowds, secure the location, and safely capture or herd animals. Their presence prevents panic, safeguards human lives, and protects wildlife from retaliatory violence.

40. (B) II, III, and IV only
Managing problem wildlife involves complex biological considerations. Translocation often fails due to homing instincts, where animals attempt to navigate back to their original home range, creating conflicts along the way. Individuals unfit for wild release are housed in lifetime rescue centers, while chemical tranquilization protocols must strictly account for ambient temperature and physical condition.

41. (D) High stress and noise can induce adrenaline spikes, delaying sedation or triggering attacks
Managing crowds during chemical capture operations is vital for safety and operational success. Large, noisy crowds induce severe psychological stress in trapped big cats, triggering massive adrenaline spikes that counteract or delay tranquilization drugs. Furthermore, agitated animals become unpredictable, increasing the danger of aggressive panic attacks directed at field staff and surrounding onlookers.

42. (A) It is placed in permanent captivity at a zoo or rescue center without release
Standard operating procedures established by the National Tiger Conservation Authority mandate that confirmed man-eating tigers must be permanently removed from the wild. Once an individual tiger is definitively identified as a habitual human predator, it is captured and placed in lifetime captivity within an approved zoo or rescue facility to prevent further loss of life.

43. (B) Locals are first responders whose traditional knowledge and cooperation prevent retaliation
Local community participation is crucial for managing human-wildlife conflict effectively because fringe residents are immediate first responders during straying incidents. Local villagers possess invaluable traditional knowledge regarding regional animal movement patterns. Their active cooperation with forest authorities facilitates early detection, streamlines emergency response operations, and prevents angry retaliatory killings of straying wild animals.

NODIA

from stepping across or stepping down comfortably. When maintained properly, these physical barriers keep elephant herds contained within designated forest boundaries and protect neighboring crops.

27. (B) Soil erosion and infilling by humans or animals reduce their physical depth
Elephant Proof Trenches lose structural effectiveness over time primarily due to severe soil erosion caused by heavy seasonal rains. Additionally, natural infilling by shifting sediment, falling debris, or intentional filling by people and crossing animals gradually reduces trench depth and wall slope. As dimensions degrade, wild elephants easily navigate across weakened sections of the barrier.

28. (B) Bio-fencing uses thorny or repellent live plants like agave and cactus as physical deterrents
Bio-fencing utilizes living, thorny, or unpalatable plant species planted densely along property boundaries to create continuous natural barriers. Unlike static physical fences, bio-fences incorporate growing vegetation like agave, cactus, or bamboo that physically obstruct animal movement. This approach provides an eco-friendly, long-lasting deterrent that prevents wild animals from penetrating agricultural lands while minimizing operational costs.

29. (A) Wire-connected active beehives that release swarming bees when disturbed, deterring elephants
A beehive fence consists of interconnected live beehives suspended on wire perimeters erected around agricultural fields. When wild elephants attempt to push through the wire, the movement disturbs the hives, releasing swarms of aggressive honeybees. Elephants possess an innate fear of bee stings around sensitive trunk tissues, prompting them to retreat immediately from farmlands.

30. (C) To reduce retaliatory killings by offsetting economic losses incurred by farmers
Compensation and insurance schemes serve as financial mechanisms to offset economic losses caused by wildlife damage to crops, livestock, or property. By providing prompt monetary relief to affected rural landholders, these programs alleviate financial distress and reduce public anger. Mitigating economic hardship directly discourages disgruntled farmers from resorting to illegal retaliatory killings of wild animals.

31. (D) To the legal heir or dependents of the deceased
Under state ex-gratia compensation guidelines in Uttar Pradesh, financial compensation for fatal wild animal attacks is disbursed directly to the legal heirs or surviving dependents of the victim. This immediate financial relief aims to support grieving families who have lost a primary wage earner, alleviating sudden economic hardship caused by human-wildlife conflict incidents.

32. (C) The crop was raised illegally on encroached forest land
Farmers who cultivate crops on illegally encroached forest land are disqualified from receiving government crop damage compensation. Compensation policies mandate that agricultural activities must take place on legally recognized private or leased land holdings. Disqualifying illegal encroachments prevents human expansion into protected habitats and deters unlawful land clearing along vulnerable forest boundaries.

33. (B) Schemes calculate losses at block levels rather than evaluating localized plot damage
General agricultural insurance frameworks like Pradhan Mantri Fasal Bima Yojana struggle to address wildlife damage effectively because loss assessments are calculated at block levels rather than individual farm plots. Wildlife crop depredation is usually highly localized, causing devastating destruction to specific boundary farms while adjacent areas remain unaffected, resulting in inadequate coverage for affected farmers.

34. (D) It delivers a brief, non-lethal shock creating a psychological boundary
Solar-powered electric fences operate by delivering high-voltage, low-amperage electrical pulses along exposed perimeter wires. When a wild animal touches the fence wire, it experiences a brief, non-lethal shock that causes immediate discomfort without inflicting physical injury. This harmless electrical sensation creates a strong psychological barrier, training animals to avoid approaching protected property boundaries.

35. (A) P-2, Q-1, R-3, S-4
Matching conflict mitigation techniques to target species relies on understanding specific

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53. (A) Girwa (Ghaghara system)
Katerniaghat Wildlife Sanctuary is a major human-wildlife conflict hotspot situated within the Girwa river basin, which forms part of the larger Ghaghara river system. The sanctuary's riverine ecosystems, dense forests, and surrounding agricultural matrix host diverse wildlife, including tigers, leopards, rhinos, and elephants, leading to frequent interactions with local rural populations.

54. (D) Regulating fringe land use to safely absorb wildlife spillover from core areas
Buffer zone management reduces human-wildlife conflict by regulating human activities and land use directly surrounding strictly protected core areas. By establishing sustainable forestry, agro-forestry, and controlled development in buffer zones, these peripheral areas safely absorb wild animal spillover from core reserves, preventing wild populations from venturing directly into high-density human settlements and agricultural lands.

55. (A) I and II only
Under Section 11 of the Wildlife Protection Act, 1972, hunting or removing a Schedule I animal is permitted if the Chief Wildlife Warden is satisfied that the individual animal has become dangerous to human life. Private citizens cannot independently declare animals as man-eaters, ensuring strict statutory oversight over any management decision involving protected wildlife species.

56. (C) It remains the property of the State Government
According to the Wildlife Protection Act, 1972, any wild animal killed or captured in self-defense remains the absolute property of the State Government. Individuals who kill animals in self-defense must immediately report the incident and surrender the carcass to forest authorities, preventing commercial exploitation or illegal trade under the pretext of self-defense claims.

57. (D) Running community mock drills and local street plays on safety measures
Conducting community mock drills and street plays provides an effective, practical strategy for mitigating public panic during animal straying incidents. These interactive awareness programs educate local residents on calm behavioral protocols, emergency reporting, and safety measures. Educated communities cooperate better with law enforcement and forest response teams, reducing accidental injuries during stray leopard encounters.

58. (A) Keep bystanders at a distance to give the animal an unblocked escape path
Official national guidelines emphasize maintaining crowd control during wild animal straying incidents in human settlements. Keeping onlookers and bystanders at a safe distance creates a clear, unblocked escape pathway for the animal. Reducing visual and acoustic stress encourages the disoriented wild creature to exit urban areas naturally without launching panicked, aggressive attacks on citizens.

59. (B) A GPS-enabled satellite radio collar
GPS-enabled satellite radio collars are widely deployed by forest managers to track the movement patterns of chronically problematic wild elephants. These electronic tracking devices transmit real-time location data directly to monitoring teams, enabling rapid response units to predict herd trajectories, issue timely warnings to nearby villages, and deploy preventive measures before crop-raiding occurs.

60. (B) They identify specific animals by coat patterns to ensure target capture
Camera traps assist wildlife managers in resolving conflict incidents by capturing detailed high-resolution photographs of target carnivores. Biologists analyze unique coat stripe or spot patterns on tigers and leopards to precisely identify specific problem individuals. Accurate photographic identification ensures response teams capture or translocate the correct animal without disrupting non-target wildlife populations.

61. (A) Elephant
Recent human-wildlife conflict data in India indicates that wild elephants cause the highest number of human fatalities annually among all wild species. Large megaherbivore herds roaming outside protected reserves frequently encounter rural residents during nocturnal crop-raiding incidents or corridor crossings, resulting in tragic accidental encounters, significant loss of human life, and property damage.

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62. (C) They offer technical guidance, RRT training, and community engagement support
Non-governmental organizations like Wildlife Trust of India and WWF-India play a vital supportive role in managing human-wildlife conflict alongside state forest departments. They provide technical expertise, assist in training Rapid Response Teams, conduct scientific monitoring, and run community engagement programs. Their collaborative efforts enhance local capacity for effective mitigation and landscape-level coexistence.

63. (D) It restricts chaotic human development across vital wildlife corridors and habitats
Comprehensive land-use planning is essential for long-term conflict resolution because it prevents chaotic human expansion across vital wildlife corridors and contiguous habitats. Regulating construction, agriculture, and industrial development around protected areas maintains functional ecological connectivity, allowing wild animals to migrate naturally between habitat patches without penetrating dense human habitations or high-density farmlands.

64. (C) Switching from attractive crops like sugarcane to deterrent crops like lemongrass near borders
Changing cropping patterns along forest edges involves replacing highly attractive, palatable crops like sugarcane and paddy with deterrent or unpalatable alternatives like lemongrass, ginger, and chili. Wild herbivores find these alternative crops unappealing, significantly reducing crop-raiding frequency along forest margins while providing local farmers with alternative agricultural revenue streams and improved protection.

65. (B) Classify them temporarily as 'Vermin' under WPA 1972 to allow localized culling
When wild boars cause extensive, uncontrollable crop destruction, state governments can invoke provisions under the Wildlife Protection Act, 1972, to temporarily classify the species as 'Vermin' within specified administrative regions. This temporary legal reclassification permits regulated, localized culling operations to control population numbers and alleviate severe economic losses suffered by local agricultural communities.

66. (D) Surprise encounters with locals gathering forest produce like Mahua and tendu leaves
Human-sloth bear conflict in the Vindhyan and Bundelkhand regions of Uttar Pradesh primarily stems from surprise encounters during seasonal non-timber forest produce collection. Local villagers entering dense forests at dawn or dusk to gather Mahua flowers and tendu leaves unexpectedly stumble upon foraging bears, triggering immediate, defensive bear attacks resulting in severe human injuries.

67. (A) Charging at the elephant with bright lights to assert dominance
Charging aggressively at a wild elephant with bright lights is dangerous and strongly discouraged by wildlife experts. Aggressive behavior or loud sudden movements startle elephants, provoking defensive or charge attacks from these massive animals. Instead, individuals should remain fully quiet, slowly retreat while facing the animal, and maintain ample physical distance to permit safe departure.

68. (C) Jim Corbett National Park
Amangarh Tiger Reserve in Uttar Pradesh acts as a critical ecological buffer zone for Jim Corbett National Park in neighboring Uttarakhand. This contiguous forest belt facilitates significant cross-border movement of wild megafauna, including tigers and elephants. Managing conflict in Amangarh is crucial for maintaining regional ecological connectivity across the Terai Arc Landscape.

69. (A) Strong homing instincts drive them to travel back, sparking new conflicts along their path
Translocating problem leopards is generally considered an ineffective long-term solution because leopards possess strong homing instincts. Displaced big cats frequently attempt to navigate back across long distances to their original home ranges. During these extensive homing journeys, disoriented leopards travel through unfamiliar, human-dominated landscapes, frequently triggering new conflict incidents along their path.

70. (C) I, II, and IV only
Acoustic deterrents gradually lose effectiveness as wild animals grow accustomed to repeated noises over time. Solar fencing requires active community maintenance to remain functional against vegetation grounding. Furthermore, restoring wildlife corridors necessitates seamless

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inter-departmental coordination among forest, highways, and railway authorities. However, ex-gratia compensation merely alleviates immediate financial distress without resolving root conflict drivers.

71. (B) To engage locals, manage initial crowds, and alert the Forest Department
Primary Response Teams formed at the village level in Uttar Pradesh act as crucial local first responders during human-wildlife conflict incidents. Comprising trained community volunteers, these teams engage local residents, establish immediate crowd control, monitor animal movements, and instantly alert forest department officials, preventing escalation and facilitating safe operational handling by specialized rapid units.

72. (C) It attracts scavengers like feral dogs, drawing apex predators near human habitations
Improper dumping of poultry and slaughterhouse waste along village perimeters significantly exacerbates human-wildlife conflict. Scavenging opportunities attract large numbers of free-ranging feral dogs to village margins. High feral dog densities, in turn, draw opportunistic apex predators like leopards closer to human habitations, increasing the likelihood of livestock loss and dangerous human-carnivore encounters.

73. (D) Setting crude wire snares and deploying poisoned animal carcasses
Setting crude wire snares and placing poisoned livestock carcasses represent traditional, highly illegal methods used by disgruntled villagers to retaliate against problem wildlife. These unselective retaliatory tactics inflict severe injuries or agonizing death on target and non-target species alike, including endangered big cats, severely undermining wildlife conservation efforts and triggering strict legal prosecution.

74. (A) Keeping children inside after dusk and illuminating village paths
The "Living with Leopards" public awareness campaign emphasizes vital behavioral adaptations to reduce human-leopard conflict. Key recommendations include keeping children securely indoors after sunset, illuminating village pathways, securing domestic livestock in predator-proof shelters, and clearing dense bushes around residential houses to eliminate potential hiding cover for stalking nocturnal predators.

75. (A) P-2, Q-4, R-1, S-3
Matching Uttar Pradesh's wildlife reserves to their primary geographical districts connects Dudhwa National Park with Lakhimpur Kheri, Pilibhit Tiger Reserve with Pilibhit district, Katerniaghat Wildlife Sanctuary with Bahraich, and the newly established Ranipur Tiger Reserve with Chitrakoot district. Proper spatial management across these districts is essential for maintaining habitat connectivity and mitigating localized conflicts.

76. (B) Securing a safety perimeter around the animal and controlling local crowds
When a wild elephant enters a densely populated urban area, the immediate operational priority of the Rapid Response Team is securing a safe perimeter and managing public crowds. Controlling gathering onlookers minimizes noise and stress, preventing the disoriented elephant from panicking. Establishing physical space allows veterinary and forest staff to safely attempt non-lethal herd driving or tranquilization protocols.

77. (A) Geographic Information System
Geographic Information Systems (GIS) serve as critical modern geospatial tools for mapping conflict hotspots and planning ecological corridors. By overlaying spatial data on land use, animal movement tracks, human settlements, and vegetation cover, GIS enables wildlife managers to identify high-risk conflict zones, design effective corridor alignments, and deploy targeted mitigation infrastructure precisely where needed.

78. (C) Locals killing wildlife in revenge for lost lives, livestock, or crops
Retaliatory killing refers to the unlawful deliberate killing of wild animals by local community members in revenge for economic or personal losses. Disgruntled farmers and herders resort to poisoning, snaring, or shooting wildlife after suffering crop destruction, livestock predation, or human casualties, posing a severe threat to the long-term survival of endangered species.

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79. (D) They serve as easy prey, sustaining leopard numbers near villages
Domestic feral dogs play a crucial ecological role in human-leopard conflict along forest fringes. High feral dog populations around human settlements provide an easily accessible, abundant prey base for leopards. Attracted by this convenient food source, leopards routinely hunt near village perimeters, increasing overall big cat density around human habitations and escalating accidental conflict risks.

80. (C) It addresses infrastructure hazards through prompt rescue, preventing animal deaths
Rescuing wild animals that have fallen into uncovered agricultural wells is a critical conflict management function. Open wells act as fatal hazards, trapping disoriented wildlife like leopards, bears, and deer. Prompt extraction by rescue teams prevents animal drowning, eliminates prolonged distress, and fosters local goodwill by addressing dangerous open infrastructure hazards across farming landscapes.

81. (B) Section 11
Section 11 of the Wildlife Protection Act, 1972, contains explicit statutory provisions governing the hunting or capture of wild animals in special cases. It authorizes specific wildlife authorities to permit hunting, capture, or tranquilization of protected species listed under Schedule I if an individual animal has become dangerous to human life or disabled beyond recovery.

82. (D) The Chief Wildlife Warden of the State
Under the Wildlife Protection Act, 1972, the Chief Wildlife Warden of the State is the sole legal authority empowered to declare a Schedule I wild animal, such as a tiger or leopard, as a threat to human life. Only this designated authority can officially sanction the capture, tranquilization, or lethal culling of a problem animal.

83. (A) Supplying alternative fuel and fodder, lowering community reliance on core forests
Implementing agro-forestry models along forest edges helps mitigate human-wildlife conflict by establishing sustainable local supplies of timber, fuelwood, and fodder. Providing these resources on private or community lands significantly reduces the necessity for fringe villagers to venture deep into protected forest habitats, minimizing human disturbance in core wildlife areas and lowering dangerous animal encounters.

84. (C) Loss of natural fear of humans due to repeated exposure or feeding
Habituation in wildlife describes the gradual loss of an animal's natural fear of humans resulting from repeated, non-threatening exposure or direct feeding. Habituated animals associate human presence and habitations with easy food access, leading them to venture frequently into villages and towns, which significantly increases crop raiding, structural damage, and dangerous encounters.

85. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Cultivating highly palatable crops like maize and sugarcane directly adjacent to wildlife sanctuary boundaries is strongly discouraged because these crops act as powerful olfactory and nutritional attractants. Wild herbivores and omnivores venture out of protected habitats to feed on these nutrient-rich fields, leading to extensive crop depredation and triggering severe human-wildlife conflict along boundary lines.

86. (D) It leads to fatal electrocution of megafauna and strict prosecution of offenders
Illegal hooking of high-tension electrical wires by farmers to energize crop perimeter fences poses a devastating threat to wildlife. Unregulated high-voltage current results in immediate, fatal electrocution of megafauna like elephants, tigers, and leopards touching the fence. Forest authorities strictly prosecute offenders under wildlife protection laws due to the severe mortality inflicted on endangered species.

87. (B) A land strip connecting two larger habitats to facilitate seasonal movement
Under official Project Elephant guidelines, an elephant corridor is defined as a linear strip of land connecting two larger forest habitats or protected areas. These crucial ecological pathways facilitate seasonal movement, foraging, and genetic exchange between isolated elephant populations, reducing habitat fragmentation and keeping migrating herds away from high-density human settlements.

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88. (C) Fires destroy natural forage and habitat, driving wildlife into nearby settlements
Uncontrolled forest fires severely exacerbate human-wildlife conflict by destroying large swathes of natural vegetation and forage inside protected habitats. Deprived of essential food resources and shelter, wild animals are forced to flee burned areas and venture into nearby agricultural lands and fringe villages, drastically increasing crop raiding, livestock loss, and encounters with local communities.

89. (D) Using trained captive elephants (Kumkis) to guide the herd back to the forest
Deploying trained captive elephants, known as Kumkis, represents a highly effective, non-lethal method used by rapid response teams to manage wild elephant herds. Experienced Kumkis and trained mahouts maneuver safely near wild herds, using physical presence and vocal cues to gently guide disoriented or crop-raiding elephants away from human habitations and back into protected forests.

90. (A) A temporary site for veterinary evaluation and monitoring before release decisions
In emergency protocols for tiger straying, a holding center serves as a secure, specialized temporary facility. Captured big cats are housed briefly at these facilities for comprehensive veterinary evaluation, behavioral observation, and medical treatment. Based on health status and behavioral assessments, wildlife authorities determine whether the animal can be released back into the wild or kept in captivity.

91. (B) High voltage (7000-9000V) with short, pulsating low current
Wildlife deterrent solar fences are engineered to operate at high voltages, typically ranging between 7000 and 9000 volts, combined with extremely short, low-current electrical pulses. This specific configuration delivers a sharp, painful shock that startles approaching animals without causing internal organ damage, thermal burns, or fatal injury, establishing an effective non-lethal psychological boundary along farm perimeters.

92. (B) Removing weeds restores native forage and prey, keeping animals within the forest
Systematically eradicating invasive weeds like Lantana camara inside protected areas allows native grasses, shrubs, and forage plants to regenerate naturally. Restoring native vegetation enhances the natural food supply and prey base within forest ecosystems. Adequate forest resources keep wild herbivores and carnivores satisfied inside reserve boundaries, significantly reducing straying behavior into agricultural lands.

93. (A) Forgone income, time, and education spent on night field guarding
Opportunity cost represents a profound indirect socio-economic burden incurred by rural communities facing persistent human-wildlife conflict. Farmers spend critical nighttime hours guarding crops from watchtowers, sacrificing personal rest, educational pursuits, and secondary income opportunities. This heavy diversion of time and labor lowers overall quality of life and limits economic advancement for vulnerable households along forest margins.

94. (C) Population growth exceeding carrying capacity, forcing wildlife into nearby human landscapes
The spillover effect in protected area management occurs when wild animal populations grow and exceed the natural carrying capacity of a reserve. Resource competition within crowded habitats forces excess, young, or displaced individuals to move outward into marginal fringe zones and human-dominated agricultural landscapes, driving up the frequency of livestock predation and human-wildlife encounters.

95. (B) II, IV, I, III
Managing a strayed leopard inside a residential structure requires a logical step-by-step sequence. First, authorities control public crowds and secure the perimeter. Next, officials confirm the animal's exact location inside the building. Once located, veterinary staff perform safe chemical immobilization, followed immediately by health evaluation and transport of the tranquilized big cat in a secure cage.

96. (C) Habituation to human food impairs natural foraging, driving macaques back to towns
Translocating conflict-causing urban macaques into deep forest habitats frequently fails because habituation to human food sources alters natural foraging behavior. Monkeys accustomed to scavenging high-calorie processed foods struggle to adapt to wild forest diets. Driven by hunger and familiar behavioral habits, translocated

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macaques quickly leave wild release sites to search for human settlements and towns.

97. (B) The maximum species population an environment can sustainably support with available resources
Carrying capacity refers to the maximum population size of a species that a specific forest ecosystem can sustainably support over time without habitat degradation. It is determined by available ecological resources, including food, water, shelter, and territorial space. Exceeding carrying capacity forces surplus animals beyond forest boundaries, escalating conflict in surrounding human landscapes.

98. (D) Removing waste dumps reduces feral prey numbers, keeping leopards away from towns
Proper solid waste and garbage management in towns adjacent to forests significantly reduces human-leopard conflict. Eliminating open refuse dumps deprives free-ranging feral dogs and pigs of scavenged food, lowering their urban population densities. Reducing stray domestic prey around town perimeters removes major attractants for leopards, discouraging big cats from entering residential areas to hunt.

99. (A) Spreading public awareness and welfare measures to promote human-elephant coexistence
The "Hathi Mere Sathi" campaign was launched by the Ministry of Environment, Forest and Climate Change to raise public awareness regarding Asian elephant conservation. The initiative focused on promoting human-elephant coexistence, securing vital migration corridors, encouraging community participation, and mitigating widespread human-elephant conflict across major elephant range states in India through educational outreach.

100. (C) To verify actual crop damage and prevent fraudulent compensation claims
Joint on-site inspections conducted by Revenue and Forest Department officials are mandatory for evaluating wildlife damage compensation claims. This dual-agency verification ensures physical assessment of crop damage, destroyed property, or livestock loss directly at the conflict site. Accurate field inspection verifies genuine claims, determines precise financial losses, and prevents fraudulent claims against state compensation funds.

101. (A) Limited sight and hearing cause sudden close encounters, triggering defensive attacks
Sloth bears possess naturally poor eyesight and hearing capabilities, making them easily surprised by humans approaching at close range in dense forests. When startled unexpectedly, sloth bears react instinctively with severe defensive aggression to protect themselves or their cubs. Their powerful claws and sharp teeth inflict devastating physical injuries during these sudden, accidental close-range encounters.

102. (D) Psychological stress and reluctance to invest in farming due to crop raid fears
Indirect costs of human-wildlife conflict include non-monetary, psychological, and long-term socio-economic burdens borne by affected communities. Persistent fear of animal attacks creates severe psychological strain, chronic anxiety, and sleep deprivation. Furthermore, constant crop destruction discourages farmers from investing in high-value agricultural crops or modernizing farming techniques, perpetuating economic instability in rural fringe regions.

103. (B) A peripheral area supporting sustainable livelihoods and human-wildlife coexistence
A buffer zone in tiger reserves refers to the designated peripheral area surrounding the strictly protected core habitat. Buffer zones are managed to promote sustainable land use, agro-forestry, and eco-tourism while providing livelihood support for local communities. This managed space absorbs wildlife spillover from core zones, creating a transitional landscape that fosters human-wildlife coexistence.

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104. (C) UP Forest Department
The Uttar Pradesh Forest Department holds statutory responsibility for processing and disbursing financial compensation for human casualties, injuries, livestock predation, and crop destruction caused by wild animals. Field officers conduct verification assessments, process application files, and coordinate ex-gratia payments to affected victims or their legal heirs to alleviate immediate financial hardship caused by conflict.

105. (A) P-2, Q-1, R-4, S-3
Modern conservation technologies serve specific conflict management functions. VHF radio collars facilitate real-time telemetry tracking of wild animal movements. Camera traps capture high-

resolution imagery to identify individual animals via unique stripe or spot patterns. Unmanned aerial drones conduct aerial surveillance over thick vegetation, while acoustic deterrents emit high-frequency sounds to keep animals away from settlements.

106. (A) Chemical runoff poisons non-target wildlife and disrupts ecosystem balance
Excessive chemical pesticide application on farmlands adjacent to forest borders poses severe environmental hazards. Pesticide runoff contaminates local water sources and terrestrial food chains within protected ecosystems, non-target wild species. Ecological disruption reduces natural insect and prey populations, destabilizing habitat balance and driving wildlife to range further into human-dominated landscapes in search of food.

107. (B) Marginalized fringe farmers and herders lacking resources for mitigation
Marginalized fringe farmers and pastoral herders living adjacent to forest boundaries represent the most vulnerable demographic regarding human-wildlife conflict. These communities rely heavily on small landholdings and open livestock grazing for subsistence. Lacking financial resources to install expensive protective fencing or secure shelters, crop raids and livestock loss severely threaten their basic economic survival.

108. (B) It keeps cattle out of forests, preserving herbivore forage and preventing predation
Promoting stall feeding of livestock over open forest grazing significantly mitigates human-carnivore conflict. Confining domestic cattle to secure village shelters keeps them out of protected forest habitats, preserving natural herbivore forage and preventing livestock predation by big cats. Furthermore, reducing livestock availability inside forests encourages native predators to target wild prey species exclusively.

109. (A) Xylazine-Ketamine mixture
A combination of Xylazine and Ketamine is the standard anesthetic formulation widely utilized by Indian wildlife veterinarians for chemical capture. Discharged via pneumatic tranquilizer darts, this pharmaceutical mixture produces reliable sedative and muscle-relaxant effects in large carnivores like tigers and leopards, enabling veterinary teams to safely handle, treat, or translocate problem individuals without pain.

110. (C) Submerging prime forests forces displaced wildlife into surrounding human areas
Large developmental projects like hydroelectric dams and reservoirs contribute significantly to human-wildlife conflict by flooding extensive tracts of prime forest habitat. Reservoirs displace wild animal populations from established home ranges and disrupt traditional movement corridors. Displaced wildlife is forced into surrounding human-dominated landscapes, leading to increased crop raiding, livestock loss, and fringe encounters.

111. (D) The outer area where management and locals collaborate on sustainable development
The transition zone of a Biosphere Reserve forms the outermost managed region surrounding core and buffer zones. In this area, local communities, conservation scientists, and management authorities collaborate to implement sustainable economic activities, eco-friendly agriculture, and local development. Active stakeholder cooperation in transition zones helps balance natural resource conservation with human livelihood needs, minimizing conflict.

112. (C) Mothers leave cubs temporarily while hunting; human removal disrupts natural rearing
The Forest Department strongly discourages removing seemingly abandoned leopard cubs found in sugarcane fields because female leopards routinely leave cubs hidden in dense cover while hunting. Mother leopards return to retrieve offspring once human presence clears. Removing cubs unnecessarily disrupts natural maternal rearing, leading to permanent separation and creating long-term captive management challenges for authorities.

113. (B) Monitor a nighttime reunion attempt by returning the cub to its exact site
When a young leopard cub is inadvertently picked up by villagers, the standard operating procedure mandates conducting a monitored reunion attempt. Field staff place the cub back at the exact location of discovery inside a secure basket during nighttime hours. Remote monitoring ensures the mother leopard can return and safely retrieve her cub without human interference.

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131. (A) Carry lights and sticks at night, and clear clutter and rodents around homes
Preventing snakebites requires practical precautions around rural habitations. Public awareness campaigns advise villagers to carry lights and walking sticks when moving outdoors at night, enabling them to detect reptiles and signal their presence. Furthermore, clearing agricultural clutter, tall grass, and rodent populations around home perimeters removes key attractants, significantly lowering snake encounter risks.

132. (C) Degradation in these buffer zones bordering settlements drives wildlife into farmlands
Monitoring 'Open Forest' and 'Scrub' categories in the India State of Forest Report is crucial for human-wildlife conflict management. Degradation of these peripheral buffer habitats reduces natural cover and forage near settlements. Shrinking buffer resources forces wild species out of forest margins and into adjacent agricultural farmlands, escalating crop raiding and human-animal encounters.

133. (A) Nawabganj Sanctuary
Nawabganj Bird Sanctuary, a designated Ramsar wetland site in Uttar Pradesh, attracts large flocks of native and migratory waterfowl annually. Surrounding agricultural farmlands experience localized conflicts when roosting avian populations feed on standing cereal crops and fish ponds, prompting local farmers to deploy non-lethal acoustic deterrents and visual scarecrows to protect their agricultural yields.

134. (D) To support state efforts in managing wild elephants, mitigating conflict, and protecting corridors
Project Elephant was launched by the Government of India in 1992 to provide financial and technical support to elephant range states. The initiative focuses on securing long-term elephant populations, restoring natural migration corridors, mitigating human-elephant conflict in agricultural landscapes, and improving conditions for captive elephants through standardized health and welfare management protocols.

135. (B) I, II, and IV only
Human-wildlife conflict imposes severe socio-economic burdens on rural fringe communities. Crop raids directly threaten household food security, while the burden of guarding fields at night falls heavily on family members, including women. Furthermore, persistent financial losses foster deep resentment against forest authorities. Crucially, insurance payouts do not generate economic growth but merely offer partial relief.

136. (C) Schedule I
Schedule I of the Wildlife Protection Act, 1972, affords the highest level of legal protection to wild species in India. Animals listed under this Schedule, such as tigers, leopards, and elephants, receive absolute legal immunity from hunting or trade. Offenses involving Schedule I species attract the most severe statutory penalties, heavy fines, and mandatory imprisonment.

137. (D) Swamp Deer
The Swamp Deer, locally known as Barasingha, is the official State Animal of Uttar Pradesh. Heavily protected under Schedule I of the Wildlife Protection Act, 1972, this endangered cervid relies on swampy grasslands across the Terai ecosystem, notably within Dudhwa National Park. Protecting Barasingha habitats remains essential for maintaining balanced wetland ecosystems.

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138. (A) It buffers financial losses, preserving community tolerance toward wild species
Implementing efficient and transparent compensation mechanisms significantly enhances local community tolerance toward wild species. Disbursing fair monetary reimbursement directly buffers agriculturalists against sudden financial distress caused by crop raiding or livestock predation. Compensating economic losses reduces public hostility, encouraging fringe communities to support local conservation initiatives and coexist peacefully with wildlife.

139. (B) A joint effort using noise, fire, or kumkis to herd elephants back into forest bounds
A drive operation in elephant conflict management is a coordinated field effort executed to move straying elephant herds out of human settlements. Forest staff and community members utilize controlled noise, fire torches, and trained Kumki elephants to guide crop-raiding herds safely away from farmlands and direct them back into designated protected forest areas.

participate actively in sustainable resource management, reducing ecological degradation and encouraging long-term coexistence between humans and wildlife across shared landscapes.

123. (B) Instantly shooting the tiger without assessing behavior or attempting capture
Standard Operating Procedures issued by the National Tiger Conservation Authority strictly prohibit shooting a straying tiger as an immediate first response. When a tiger enters human-dominated landscapes, authorities must first assess animal behavior, establish perimeter crowd control, and attempt non-lethal measures like herd driving, camera monitoring, or chemical capture before considering lethal measures.

124. (B) Human food sources like garbage and crops that sustain wildlife near human areas
Anthropogenic food subsidies refer to easily accessible, human-derived nutritional sources available near habitations, such as agricultural crops, stored grains, open garbage dumps, and domestic livestock. These abundant food subsidies attract wild animals to fringe villages, sustaining high wildlife densities near settlements and escalating crop raiding, property damage, and dangerous human-wildlife encounters.

125. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Establishing strong trust between local communities and the Forest Department is essential for managing human-wildlife conflict effectively. When villagers distrust forest authorities, they hesitate to report straying animals promptly, obstruct rescue operations, and resort to secretive retaliatory killings using poison or snares, severely compromising conservation efforts and community safety across shared landscapes.

126. (C) Gathering forest produce like dry wood and honey
Gathering non-timber forest produce like dry firewood, honey, Mahua flowers, and tendu leaves represents a widespread traditional economic activity in rural Uttar Pradesh. Villagers frequently enter dense forest zones at dawn or dusk to collect these natural resources, inadvertently placing themselves in close proximity to concealed big cats and triggering sudden, life-threatening encounters.

127. (D) To reduce noise and headlight glare, encouraging animals to use underpasses
Modern highways constructed through critical wildlife corridors feature noise barriers and light screens to minimize ecological disturbance caused by passing traffic. Shielding bright vehicle headlights and muffling loud engine sounds prevents wild animals from becoming startled or disoriented. These physical screens encourage wildlife to utilize designated underpasses and eco-bridges safely, reducing roadkill risks.

128. (C) An individual animal repeatedly damaging property, preying on livestock, or posing human threats
A problem animal is specifically defined as an individual wild animal that repeatedly exhibits dangerous or destructive behaviors toward human lives and property. Such individuals habitually engage in crop raiding, livestock predation, structural destruction, or unprovoked attacks on humans, requiring specialized management interventions like capture, chemical immobilization, translocation, or permanent lifetime captivity.

129. (B) They control crop-raiding herbivore populations, preserving balance
Maintaining healthy apex predator populations like tigers and leopards provides vital ecological benefits to local agricultural communities. Large carnivores control populations of wild herbivores like nilgai, wild boars, and deer through natural predation. Regulating herbivore densities prevents unchecked population surges, significantly reducing crop-raiding destruction on surrounding agricultural farmlands and maintaining balance.

130. (D) A fodder-cutting tool in dark sheds where people gather feed, creating leopard ambush risks
A chaff cutter is a mechanical tool used in rural Uttar Pradesh to shred crop fodder for domestic livestock. These machines are commonly operated inside dark, unlit storage sheds or courtyards where fodder is stored. Working in poorly lit, enclosed areas creates prime ambush risks for leopards seeking domestic prey, leading to sudden, dangerous encounters.

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114. (D) Sunlight boosts boundary vegetation, drawing herbivores and predators near villages
The edge effect along forest perimeters drastically alters local microclimates and vegetation dynamics. Increased sunlight penetration at forest margins promotes dense, highly nutritious plant growth, including shrubs, wild fruits, and palatable grasses. This abundant vegetation attracts wild herbivores to boundary zones, drawing large carnivores close to human settlements and increasing human-wildlife conflict opportunities.

115. (B) I and III only
Translocating problem wildlife requires official statutory authorization from the Chief Wildlife Warden. Furthermore, chosen release sites must possess sufficient natural prey, water sources, and suitable habitat cover to support translocated individuals. However, carnivore translocation rarely guarantees peaceful settlement, as translocated big cats frequently exhibit homing behavior, navigating long distances back toward original territories.

116. (C) Gujjar and Vantangiya groups
Gujjar and Vantangiya communities in Uttar Pradesh maintain traditional pastoral livelihoods along the Terai forest belt. These pastoralists rely heavily on forest pastures for seasonal cattle grazing, bringing livestock into continuous contact with apex predators. Consequently, these communities experience frequent livestock depredation by tigers and leopards, making collaborative conflict mitigation and compensation schemes vital.

117. (A) Straying is wandering without harm; conflict involves loss of life, injury, or crop damage
In wildlife management, straying describes an incident where a wild animal wanders out of its natural habitat into human-dominated landscapes without causing physical injury, human death, or property destruction. In contrast, conflict implies tangible negative outcomes, including human casualties, severe injuries, livestock loss, structural destruction, or extensive agricultural crop raiding during animal encounters.

118. (D) WWF-India
WWF-India collaborates extensively with the Uttar Pradesh Forest Department on the Terai Tiger Project to address human-wildlife conflict. This joint initiative focuses on monitoring big cat populations, establishing community-based primary response teams, restoring critical movement corridors, and implementing sustainable conflict mitigation strategies across high-risk agricultural landscapes in the Terai belt.

119. (B) They block gene flow and migration routes, causing ecological harm
Constructing permanent physical barricades like high concrete walls along forest boundaries presents significant ecological drawbacks. Rigid walls completely sever natural movement corridors, fragmenting continuous habitats and blocking vital gene flow between isolated wildlife populations. Genetic isolation increases inbreeding risks and ecological vulnerability, compromising long-term species survival despite providing localized protection against animal straying.

120. (C) To train field staff and locals on emergency coordination and crowd control
Mock drills conducted by the Forest Department in conflict-prone fringe villages serve as essential practical training exercises. These simulated emergency scenarios educate field staff and local community members on proper coordination, emergency response protocols, and effective crowd control techniques. Training prepares villagers to react calmly during actual animal straying incidents, reducing panic and preventing casualties.

121. (D) Regulating forest laws, timber transit, and human access to habitats
The Indian Forest Act, 1927, serves as foundational forestry legislation regulating state control over forest lands, timber transit, and human extraction of forest produce. By defining legal classifications such as Reserved and Protected Forests, the Act restricts unauthorized human entry and resource extraction, helping preserve core natural habitats and indirectly reducing fringe human-wildlife conflict.

122. (A) It grants forest dwellers rights to manage resources, promoting coexistence
The Forest Rights Act of 2006 recognizes community rights and traditional forest tenure for forest-dwelling communities. Granting local dwellers legal authority to protect and manage forest resources fosters local stewardship over surrounding habitats. Empowered communities

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140. (B) Core Zone → Buffer Zone → Transition Zone
The standard zoning model of a Biosphere Reserve or Tiger Reserve is organized sequentially from interior to exterior. The strictly protected Core Zone occupies the innermost space, free from human exploitation. Surrounding the core is the Buffer Zone, accommodating sustainable human activities, while the outermost Transition Zone links protected landscapes with surrounding human settlements.

141. (A) To provide undisturbed, resource-rich habitat where wildlife thrives without human disruption
The primary ecological function of a Core Zone in protected area design is establishing an undisturbed sanctuary where natural ecological processes thrive. By completely banning human extraction, habitat disturbance, and industrial development, core zones supply abundant wild prey, water, and shelter. Quality habitat conditions retain wild populations inside reserves, minimizing straying into human landscapes.

142. (C) Treating HWC as a priority and adopting landscape-level coexistence approaches
Regional wildlife declarations like the Guwahati Declaration emphasize prioritizing human-wildlife conflict management through landscape-level coexistence approaches. Rather than relying on isolated physical barriers or species culling, these frameworks advocate for inter-departmental cooperation, habitat restoration, corridor protection, and community participation to minimize risks and ensure sustainable ecosystem management across shared human-wildlife landscapes.

143. (D) Community insurance schemes where local premiums are matched by conservation NGOs
Community-based insurance schemes represent innovative financial mechanisms designed to manage livestock losses caused by wild predators. Under these programs, local pastoralists pay small insurance premiums into a village conservation fund, which are matched by conservation non-governmental organizations. The fund disburses rapid financial compensation for verified livestock killings, mitigating economic losses and preventing retaliatory poisonings.

144. (C) Tracks bisect key corridors, causing fatal collisions with elephants and rhinos
The railway line running through Dudhwa Tiger Reserve represents a major human-wildlife conflict concern in Uttar Pradesh. High-speed train tracks bisect vital wildlife corridors connecting forest compartments. Moving trains frequently strike wild animals crossing the tracks, causing fatal collisions with endangered megafauna, including Asian elephants and Indian rhinoceroses, requiring stringent speed restrictions and underpasses.

145. (A) P-2, Q-4, R-1, S-3
Spatial distribution links specific conflict zones in Uttar Pradesh with distinct wildlife species. The Shivalik foothills in Saharanpur experience wild elephant movements, while the Terai sugarcane belt around Pilibhit is associated with tiger and leopard encounters. The rocky Bundelkhand terrain in Mahoba and Lalitpur hosts sloth bears, and open agricultural plains see nilgai crop raiding.

146. (D) It systematically hunts and consumes humans as primary prey due to disability or altered behavior
A wild carnivore is officially categorized as a man-eater only when scientific evidence confirms it systematically stalks, kills, and consumes human beings as primary prey. Casualties resulting from accidental close encounters, defensive reactions, or post-mortem scavenging do not qualify an animal as a man-eater, ensuring extreme culling decisions target only habitually dangerous individuals.

147. (A) Snares kill indiscriminately, causing severe injuries or death to big cats that enter them
Simple wire snares set illegally by farmers to capture wild boars pose a devastating threat to apex predators like tigers and leopards. Wire snares function indiscriminately, trapping any animal that steps through the concealed wire loop. Big cats entering snared trails suffer horrific limb or neck injuries, prolonged strangulation, and agonized deaths, severely impacting big cat survival.

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148. (C) Animal Husbandry and Forest Departments jointly
The Animal Husbandry Department and the Forest Department jointly manage the health and veterinary care of rescued wild animals in

Uttar Pradesh. Specialized veterinary officers from animal husbandry collaborate with forest staff during tranquilization operations, health evaluations, injury treatments, and pre-release monitoring to ensure animal welfare and successful rehabilitation during conflict interventions.

149. (A) Integrating human, animal, and ecosystem health to address zoonotic disease risks in conflict zones
The One Health approach integrates human, domestic animal, and environmental health management to address complex ecological issues, including human-wildlife conflict. In interaction zones, this framework focuses on monitoring and preventing cross-species zoonotic disease transmission among livestock, humans, and wild fauna. Unified health management protects public health, safeguards livestock livelihoods, and promotes wildlife conservation across shared landscapes.

150. (B) I, II, and IV only
Section 11 of the Wildlife Protection Act, 1972, permits the Chief Wildlife Warden to authorize hunting or culling of Schedule I animals if proven dangerous to human life. The authority must first confirm non-lethal options like capture, tranquilization, or translocation are unfeasible. Any animal killed under these provisions remains government property, preventing private commercial gain.

151. (B) A cage with movable walls to safely restrain wild animals for veterinary care without anesthesia
A squeeze cage is a specialized veterinary management tool featuring movable internal wire mesh walls. When a captured wild carnivore enters the cage, operators gently adjust the internal walls to safely restrain the animal against the frame. Physical restriction enables veterinarians to perform health assessments, medical treatments, or radio-collaring without administering full chemical anesthesia.

152. (C) A narrowed corridor section surrounded by human activity, making passage risky and conflict-prone
A choke point in wildlife corridors refers to a severely narrowed spatial bottleneck surrounded by intense human activities, infrastructure, or settlements. Animals navigating these constrained passages face elevated stress and restricted movement options. High animal density within choke points significantly increases the likelihood of crop destruction, livestock encounters, and human-wildlife conflict incidents.

153. (D) They bear direct costs like crop and livestock losses while receiving limited direct benefits
Fringe village communities represent critical stakeholders in wildlife conservation because they reside directly along protected area perimeters. These communities bear direct non-monetary and economic costs of conservation, including severe crop destruction, livestock losses, and physical safety risks. Involving fringe residents through compensation, eco-development, and participatory management is essential for long-term landscape protection.

154. (A) Territorial fights with resident leopards may injure the cat or drive it into nearby villages
Releasing a captured conflict leopard into an unfamiliar, fully saturated forest reserve creates severe ecological risks. Resident leopards defend established territories aggressively against intruders, leading to fatal territorial fights. Terrified and displaced by dominant resident cats, the translocated leopard is frequently driven out of the forest into surrounding fringe villages, triggering new conflict incidents.

155. (C) I and III only
Under the Wildlife Protection Act, 1972, killing a wild animal in genuine self-defense or defense of others does not constitute an offense. However, this legal defense is forfeited if the individual was engaged in an illegal act, such as poaching, when attacked. The burden of proof rests entirely on the individual to prove the act was necessary.

156. (B) Using negative stimuli like loud noise or chili spray to teach animals to avoid human areas
Aversive conditioning is a behavioral modification strategy used to deter wild animals from approaching human habitations. Management teams apply negative stimuli, such as loud acoustic noises, rubber bullets, or pungent chili sprays, during animal approach attempts. Over time, animals associate human settlements with uncomfortable experiences, learning to avoid agricultural fields and villages naturally.

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157. (A) Groundnut crops
Groundnut crops are notoriously famous for attracting wild boars across agricultural regions in Uttar Pradesh. Wild boars possess an exceptional sense of smell and actively dig up fields to feed on underground nut pods. Consequently, groundnut plantations situated near forest margins suffer extensive crop damage, prompting farmers to install perimeter fencing and conduct night guarding.

158. (C) NWAP (2017-2031)
The National Wildlife Action Plan (2017-2031) is the currently operational policy framework guiding wildlife conservation in India. This third action plan explicitly emphasizes landscape-level conservation strategies, climate change adaptation, regional corridor restoration, and comprehensive human-wildlife conflict management to reduce economic losses and foster peaceful human-animal coexistence across shared ecosystems.

159. (D) Coordinating conservation across forests, farmlands, and settlements to preserve connectivity
Landscape Level Planning in conflict management emphasizes coordinating conservation actions across continuous ecosystems, including protected reserves, agricultural farmlands, and human settlements. Rather than managing isolated forest patches, this integrated approach preserves ecological connectivity, protects migration corridors, and balances land-use activities to minimize human-wildlife encounters and sustain functional ecosystems across regional scales.

160. (C) It provides alternative income for locals, linking wildlife presence to economic gains
Promoting community-based ecotourism in buffer zones helps mitigate human-wildlife conflict by providing direct economic benefits to local residents. Employment as safari drivers, nature guides, and homestay operators links wildlife preservation with sustainable household income. When local communities experience financial gains from wild species, public tolerance increases, reducing retaliatory killings and anti-conservation hostility.

161. (B) Disperse crowds, maintain a quiet perimeter, and let the animal descend naturally at dusk
When a leopard is spotted resting in an urban tree, the most appropriate initial management approach is dispersing public crowds and maintaining a quiet security perimeter. Surrounding noise and stress prevent the animal from moving. Given undisturbed space and darkness, the disoriented leopard will naturally descend from the tree at dusk and retreat back toward natural cover.

162. (A) P-2, Q-1, R-4, S-3
Connecting national guidelines with their primary management targets links NTCA SOPs with managing straying tigers and man-eaters, Project Elephant guidelines with crop raiding and corridor protection, MoEFCC advisories with empowering Gram Panchayats for compensation, and Wildlife Institute of India technical manuals with standardizing tranquilization and animal rescue protocols.

163. (A) Wild animals preying on livestock or destroying crops
Depredation in wildlife management literature specifically refers to wild animals preying upon domestic livestock or consuming and damaging agricultural crops. Whether involving carnivores hunting cattle or herbivores crop-raiding farmlands, depredation represents a primary driver of financial loss for rural communities, sparking conflict and prompting calls for government compensation and physical mitigation barriers.

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164. (C) They offer real-time aerial monitoring of animals in dense crops without ranger risk
Unmanned Aerial Vehicles, or drones, are increasingly essential in human-wildlife conflict management because they provide safe, real-time aerial surveillance. Equipped with thermal and high-resolution cameras, drones track wild animal movements inside dense agricultural crops like sugarcane without placing field rangers in danger, enabling rapid response teams to plan precise herd driving or rescue operations.

165. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Educating children in fringe villages about wildlife behavior is a vital long-term strategy for conflict mitigation. Children are particularly vulnerable to sudden animal attacks during dawn

and dusk hours while commuting or playing near forest borders. Safety education teaches children to recognize warning signs, avoid risky behaviors, and foster positive conservation values for future landscape coexistence.

166. (D) To avoid killing non-target tigers, which harms ecosystems and leaves the problem unresolved
Precise identification of a problem tiger using camera traps is mandatory before authorizing lethal capture or elimination. Photographic analysis verifies unique stripe patterns to ensure field teams target the specific individual responsible for attacks. Accurate identification prevents the accidental removal of non-target, peaceful tigers, preserving local ecosystem stability and ensuring the actual threat is effectively eliminated.

167. (B) Marginal fringe habitats where mortality exceeds births, often occupied by transient tigers
A sink area in tiger landscape dynamics refers to marginal, fragmented fringe habitat outside protected reserves where mortality rates exceed local reproduction. Young, injured, or displaced transient tigers are pushed into these sub-optimal spaces due to core territorial competition. Facing scarce natural prey, sink tigers frequently target domestic livestock, leading to high human-wildlife conflict risks.

168. (C) I and III only
Camera traps function using passive infrared sensors triggered by heat and movement, operating effectively day and night using invisible flash technology. They are critical scientific tools for identifying individual animals and estimating big cat densities in human-dominated landscapes. By capturing round-the-clock imagery, camera traps assist managers in monitoring animal straying and planning targeted mitigation strategies.

169. (B) I, II, and IV only
Effective land-use planning around protected areas relies on Eco-Sensitive Zones to regulate industrial expansion and absorb ecological shocks. Unregulated mining in migration corridors severe connectivity, escalating human-animal encounters, while linear infrastructure must incorporate underpasses or bypass habitats. However, building resorts directly along core boundaries exacerbates human disturbance and is strictly discouraged by management guidelines.

170. (C) I, III, IV, II
Radio-collaring a problem elephant follows a strict sequential operational protocol. First, field tracking teams locate the elephant herd to identify the specific target individual. Next, veterinary staff perform chemical immobilization via tranquilizer darting. Once secured, officers fit the GPS collar and administer a reversal antidote, before finally releasing the elephant to initiate real-time satellite telemetry monitoring.

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CHAPTER 11

Forest Environment and Its Benefits

1. Which of the following best defines a forest ecosystem?
(A) A geographical region designated primarily for commercial agriculture and crop cultivation
(B) A dynamic complex of living organisms and their environment functioning as a unit
(C) A legally protected natural area reserved exclusively for conserving endangered wildlife
(D) An artificially established plantation designed mainly for commercial timber harvest

2. The components of a forest environment are broadly classified into biotic and abiotic. Which of the following is an abiotic component?
(A) Soil minerals
(B) Decomposers
(C) Understory vegetation
(D) Symbiotic fungi

3. In the context of forest layers, which layer receives the maximum amount of direct sunlight?
(A) The forest floor
(B) The understory layer
(C) The canopy layer
(D) The shrub layer

4. What is the primary role of saprophytic organisms in a forest environment?
(A) To synthesize organic compounds through photosynthesis in light-deprived environments
(B) To serve as apex predators regulating animal populations across the forest food web
(C) To fix free atmospheric nitrogen directly into the foliage of upper canopy trees
(D) To break down dead organic matter and recycle essential nutrients into the soil

5. Which of the following terms describes the transition zone between a forest ecosystem and an adjacent grassland ecosystem?
(A) Ecocline
(B) Biome
(C) Ecotone
(D) Biosphere

6. Identify the incorrect statement regarding the structure of a typical forest environment.
(A) The emergent layer consists of the tallest trees that protrude above the canopy.
(B) Autotrophs in a forest environment consist entirely of shade-tolerant plants.
(C) The understory is characterised by high humidity and low light availability.
(D) The forest floor contains decomposing leaves, fungi, and detritivores.

7. Non-Timber Forest Products (NTFPs) play a crucial role in the rural economy. Which of the following is considered an NTFP?
(A) Teak logs
(B) Sal roundwood
(C) Sawn mahogany timber
(D) Tendu leaves

8. Resin, a valuable direct benefit obtained from forests, is predominantly extracted from which type of trees in India?
(A) Pine trees (Pinus species)
(B) Banyan trees (Ficus benghalensis)
(C) Mango trees (Mangifera indica)
(D) Teak trees (Tectona grandis)

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9. In Uttar Pradesh, the wood of the Khair tree (Acacia catechu) is primarily used for the commercial extraction of which product?
(A) Turpentine
(B) Natural rubber
(C) Kattha
(D) Sandalwood oil

10. Consider the following statements regarding the direct benefits of forests:
I. Bamboo is legally classified as a tree under the Indian Forest Act, 1927, across all areas including private lands.
II. Mahua flowers are collected by forest-dwelling communities for food and fermentation.
III. Lac is a resinous secretion of insects cultivated on specific host trees in forests.

(A) A higher albedo, reflecting more solar radiation
(B) A lower albedo, absorbing more solar radiation
(C) The exact same albedo
(D) Zero albedo

72. Despite absorbing more solar radiation (lower albedo), tropical forests cool the Earth primarily through which mechanism?
(A) Continuously exuding cold gaseous compounds directly from root systems
(B) Mechanically blocking solar wind particles before reaching lower ground
(C) Completely absorbing all incoming solar ultraviolet radiation in foliage
(D) High evapotranspiration rates transferring heat via water vapour

73. Which of the following forest types stores the highest amount of carbon per hectare, primarily in its deep, waterlogged soils?
(A) Tropical dry deciduous forests
(B) Desert thorn forests
(C) Peatland and Mangrove forests
(D) Alpine scrub

74. What is the role of phytoplankton and terrestrial forests in the global carbon cycle?
(A) Both act exclusively as carbon emitters.
(B) Phytoplankton emit carbon, while forests absorb it.
(C) Both serve as major biological carbon sinks.
(D) Forests emit carbon, while phytoplankton absorb it.

75. Match the climate change mitigation terms in List I with their correct descriptions in List II.
List I: (Term)
P. Carbon Sequestration
Q. Afforestation
R. Deforestation
S. Carbon Footprint
List II: (Description)
1. Total greenhouse gas emissions caused by an entity
2. The long-term storage of carbon in plants and soils
3. The permanent removal of trees to make room for something besides forest
4. Establishing a forest in an area where there was no previous tree cover
(A) P-2, Q-4, R-3, S-1
(B) P-1, Q-2, R-4, S-3
(C) P-2, Q-3, R-4, S-1
(D) P-4, Q-2, R-1, S-3

76. Forests are treasure troves of medicinal resources. The widely used antimalarial drug 'Quinine' was originally extracted from the bark of which tree?
(A) Willow tree (Salix species)
(B) Cinchona tree (Cinchona species)
(C) Neem tree (Azadirachta indica)
(D) Eucalyptus tree (Eucalyptus species)

77. Which highly effective anti-cancer compound was discovered from the bark of the Pacific Yew tree?
(A) Aspirin
(B) Taxol (Paclitaxel)
(C) Penicillin
(D) Morphine

78. In Ayurveda, the plant 'Rauvolfia serpentina' (Sarpagandha), commonly found in Indian forests, is primarily used for the treatment of:
(A) High blood pressure (hypertension)
(B) Pulmonary tuberculosis infection
(C) Chronic malarial fever episodes
(D) Severe vitamin C deficiency states

79. The Indian tree known as 'Neem' is highly valued in traditional medicine and agriculture. Which of the following active compounds gives Neem its insecticidal properties?
(A) Curcumin
(B) Nicotine
(C) Azadirachtin
(D) Menthol

80. Consider the following statements regarding medicinal plants in India:
I. Amla (Indian Gooseberry) is an exceptionally rich source of Vitamin C.
II. Ashwagandha roots are traditionally used as an adaptogen to reduce stress.
III. All medicinal plants found in Indian forests can be freely harvested without any legal restrictions.
Which combination is correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II and III

81. Which common forest plant, characterized by its thick, fleshy leaves, is widely used for treating skin burns, digestive issues, and in cosmetic products?

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water runoff across catchments
(B) Significantly reducing topsoil porosity to restrict deep water percolation
(C) Retarding surface water movement to promote natural soil infiltration
(D) Absorbing atmospheric moisture directly and funneling it into deep aquifers

22. In the hydrological cycle, what happens to the majority of the water absorbed by tree roots?
(A) It is permanently locked inside the interior heartwood tissue of the trunk.
(B) It is transpired into the atmosphere as water vapour.
(C) It is fully transformed into structural carbohydrates during photosynthesis.
(D) It is exuded back through root structures into the surrounding soil at night.

23. A watershed heavily covered by native forests will typically exhibit which of the following streamflow characteristics compared to a deforested watershed?
(A) Rapidly fluctuating peak discharge during storms followed by dry summer beds
(B) Severe stream sedimentation accompanied by continuous seasonal flood events
(C) Perennially stagnant water movement across the entire drainage basin
(D) Lower peak flows in heavy rains and sustained dry-season base flow

24. Which of the following best describes 'base flow' in the context of forest hydrology?
(A) Streamflow sustained by groundwater discharge between rains
(B) The swift overland surface runoff generated during intense rainfall storms
(C) The maximum volumetric discharge a stream channel retains prior to flooding
(D) The total volume of atmospheric precipitation trapped in canopy foliage

25. The removal of forest cover in a hilly catchment area is most likely to result in:
(A) Increased groundwater recharge
(B) Decreased soil erosion
(C) Flash floods in the downstream plains
(D) Higher perennial streamflow during summer

26. Which forest ecosystem is uniquely adapted to thrive in coastal saline water and acts as a crucial buffer protecting coastal groundwater from saltwater intrusion?
(A) Mangrove forests
(B) Alpine forests
(C) Deciduous forests
(D) Thorn forests

27. Forests are often called the 'lungs of the Earth'. This is primarily because they:
(A) Continuously take in oxygen and exhale carbon dioxide throughout daytime
(B) Synthesize and release massive quantities of free atmospheric nitrogen
(C) Generate significant amounts of ground-level ozone in the troposphere
(D) Absorb carbon dioxide and release oxygen via photosynthesis

28. Which physiological process in plants is directly responsible for oxygen production?
(A) Cellular respiration in plant mitochondria
(B) Photolysis of water in photosynthesis
(C) Anaerobic glycolysis in cell cytoplasm
(D) Stomatal transpiration in plant leaves

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29. Besides oxygen production, forests purify the air by mitigating atmospheric pollution. How do trees primarily reduce particulate matter (PM10 and PM2.5)?
(A) By chemically neutralizing fine particulate matter within root tissues
(B) By metabolically converting toxic airborne particles into pure oxygen
(C) By trapping particles on leaf and bark surfaces
(D) By absorbing and dissolving airborne pollutants into internal sap streams

30. Given below are two statements, one labelled as Assertion (A) and the other as Reason (R).
Assertion (A): Forests significantly reduce the concentration of airborne pollutants like sulphur dioxide and nitrogen oxides in urban fringes.
Reason (R): The stomata of leaves absorb these gaseous pollutants during the gas exchange process.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

31. Which type of tree foliage is generally considered most effective at intercepting and holding airborne dust particles?

(C) Government forestry officials enforcing regulations under the Forest Act
(D) Private timber corporations seeking long-term sustainable logging permits

52. Eco-tourism differs from conventional mass tourism primarily in that eco-tourism:
(A) Prioritizes high-end luxury resort accommodations situated inside deep forest areas
(B) Minimizes ecological impact while supporting conservation and local communities
(C) Grants visiting tourists unrestricted vehicular access into core breeding sanctuaries
(D) Directs all generated tourism revenues exclusively into central government treasuries

53. The 'multiplier effect' in forest eco-tourism refers to:
(A) The rapid proliferation of invasive exotic species transported via safari vehicles
(B) Local circulation of tourist spending that generates secondary jobs and income
(C) The sharp upward adjustment of entrance park fees during peak seasonal visitations
(D) The concurrent population decline observed among native species as tourist influx grows

54. Which of the following activities is strictly prohibited in the core zone of a National Park under standard eco-tourism guidelines?
(A) Conducting regulated guided safari vehicles
(B) Practicing non-invasive wildlife photography
(C) Participating in seasonal birdwatching tours
(D) Building commercial resort developments

55. Consider the following statements regarding the economic prospects of eco-tourism:
I. It creates alternative employment for local poachers, converting them into nature guides.
II. It raises public awareness about environmental conservation.
III. It guarantees a complete halt to all human-wildlife conflicts.
IV. It can fund the maintenance and protection of the wildlife reserve.
Which of the statements form a correct combination?
(A) I, II, and III only
(B) II, III, and IV only
(C) I, II, and IV only
(D) I, III, and IV only

56. What is the primary objective of a 'Jungle Safari' in a protected forest area?
(A) To let visitors view wildlife in natural habitats
(B) To permit regulated sport hunting harvest of surplus game species
(C) To gather rare wild medicinal plants for personal pharmaceutical use
(D) To distribute supplemental food supplies to wild animal populations

57. Which concept emphasizes that local communities should be the primary beneficiaries of forest-based tourism revenue?
(A) Capitalist Tourism
(B) Enclave Tourism
(C) Community-Based Tourism
(D) Corporate Social Responsibility

58. The Forest Rights Act (FRA), 2006, was enacted primarily to:
(A) Mandate the complete eviction of all long-standing human settlements from protected forest lands
(B) Recognize rights of forest-dwelling Scheduled Tribes and traditional dwellers
(C) Facilitate the corporate privatization of valuable minor forest produce for commercial extraction
(D) Shift administrative oversight of major National Parks directly to state commercial tourism boards

59. Under the Forest Rights Act, which local body is empowered to initiate the process of determining the nature and extent of individual or community forest rights?
(A) The State Forest Department
(B) The District Collectorate
(C) The Sub-Divisional Level Committee
(D) The Gram Sabha

60. For many forest-dwelling communities, Minor Forest Produce (MFP) is a primary source of livelihood. Which of the following is NOT classified as MFP?
(A) Commercial timber logs
(B) Honey and natural wax
(C) Tendu foliage leaves
(D) Herbal medicinal plants

61. The TRIFED (Tribal Cooperative Marketing Development Federation of India) primarily functions to:

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(D) It severely restricts the total volume of precipitation reaching the forest floor

42. Deadwood and fallen logs in a forest are critical for biodiversity because they:
(A) Prevent localized slope erosion by completely blocking surface water runoff
(B) Provide habitat for invertebrates, fungi, and cavity nesters
(C) Suppress the ignition of wildfires by absorbing large volumes of moisture
(D) Function as the primary dietary nutrient source for large mammalian herbivores

43. A species that is found exclusively in a particular forest region and nowhere else in the world is referred to as:
(A) Exotic
(B) Invasive
(C) Endemic
(D) Migratory

44. What is the primary objective of establishing 'Wildlife Corridors' between fragmented forest patches?
(A) To serve as wide structural firebreaks during intense summer wildfire seasons
(B) To establish clear transport pathways dedicated to heavy commercial logging trucks
(C) To delineate clear administrative boundaries between state forest division territories
(D) To enable wildlife movement and genetic exchange between populations

45. Consider the following statements regarding the role of forests in biodiversity conservation:
I. Tropical rainforests cover less than 10% of the Earth's surface but harbor more than half of all terrestrial species.
II. Mangrove forests serve as vital nursery grounds for numerous marine fish species.
III. Monoculture timber plantations generally support higher biodiversity than natural mixed forests.
Which of the above combination of statements is correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II and III

46. In many traditional Indian societies, specific forest patches are protected by local communities due to deep religious beliefs and cultural reverence. What are these patches commonly called?
(A) Commercial Reserves
(B) Sacred Groves
(C) Biosphere Reserves
(D) Zoological Parks

47. Which tree is highly revered in Hinduism and Buddhism, often planted near temples, and historically associated with enlightenment?
(A) Sal (Shorea robusta)
(B) Neem (Azadirachta indica)
(C) Peepal (Ficus religiosa)
(D) Babul (Acacia nilotica)

48. The Bishnoi community, famously known for their historical sacrifice to protect trees, is native to which Indian state?
(A) Rajasthan
(B) Uttar Pradesh
(C) Madhya Pradesh
(D) Uttarakhand

49. In tribal cultures, forests are deeply integrated into festivals. The 'Sarhul' festival, which involves the worship of Sal trees, is prominently celebrated by tribes in which region?
(A) Western Ghats
(B) North-East India
(C) Chota Nagpur Plateau
(D) Thar Desert

50. Select the correct logical order of community involvement in traditional forest conservation, from the most culturally restrictive to the least restrictive:
(A) Sacred Groves → Community Reserves → Village Commons → Commercial Plantations
(B) Commercial Plantations → Village Commons → Sacred Groves → Community Reserves
(C) Village Commons → Sacred Groves → Commercial Plantations → Community Reserves
(D) Community Reserves → Commercial Plantations → Village Commons → Sacred Groves

51. The Chipko Movement, an iconic environmental struggle based on Gandhian principles of non-violence, was primarily driven by:
(A) Urban environmental activists campaigning for municipal ecological parks
(B) Local rural women clinging to trees to stop logging

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(A) Smooth, broad leaves
(B) Small, hairy (pubescent) or rough leaves
(C) Waxy, highly reflective leaves
(D) Leaves that shed constantly throughout the year

32. What happens to the rate of net oxygen production in a mature, climax forest compared to a young, rapidly growing forest?
(A) It increases dramatically due to the immense size of mature tree trunks
(B) It balances overall ecosystem respiration losses
(C) It ceases entirely because old mature trees lose their photosynthetic ability
(D) It drops below zero, causing net oxygen absorption during daylight hours

33. The concept of forests acting as a 'Carbon Sink' implies that:
(A) Forests reflect atmospheric carbon dioxide molecules back to the stratosphere
(B) They store more carbon than they release over time
(C) Forests chemically convert absorbed carbon compounds into inert nitrogen gas
(D) Forests consistently release more carbon through decay than they absorb overall

34. In which part of the forest ecosystem is the largest amount of carbon typically stored globally?
(A) Foliage within the upper canopy layer
(B) Woody stems and trunks of living trees
(C) Soil organic matter and peat layers
(D) Air layers trapped inside forest stands

35. The process by which atmospheric carbon dioxide is absorbed by trees and stored as solid carbon in their biomass is known as:
(A) Carbon offset accounting
(B) Carbon sequestration
(C) Carbon emission trading
(D) Carbon dating analysis

36. Which international mechanism provides financial incentives to developing countries for reducing emissions from deforestation and forest degradation?
(A) CITES
(B) REDD+
(C) Ramsar Convention
(D) Basel Convention

37. Deforestation contributes to global warming primarily because:
(A) Disruption of vegetation significantly reduces planetary mass and alters orbit
(B) Decay or burning of cleared trees releases stored carbon as CO_2
(C) Bare exposed soil dramatically increases reflection of incoming solar radiation
(D) Rapid decomposition of root systems consumes critical atmospheric oxygen reserves

38. Which of the following forms of forest management maximizes long-term carbon sequestration?
(A) Clear-cutting and converting to pasture
(B) Frequent, high-intensity controlled burns
(C) Sustainable selective logging with continuous afforestation
(D) Replacing native mixed forests with single-species short-rotation plantations

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39. Forests are unparalleled habitats for biodiversity. Which term describes the specific role and position a species occupies within a forest ecosystem?
(A) Habitat
(B) Ecological Niche
(C) Biotope
(D) Home range

40. Match the wildlife habitats in List I with their primary associated flagship species in India in List II.
List I: (Wildlife Habitat)
P. Gir National Park
Q. Kaziranga National Park
R. Periyar National Park
S. Hemis National Park
List II: (Flagship Species)
1. Asian Elephant
2. Snow Leopard
3. Asiatic Lion
4. One-horned Rhinoceros
(A) P-3, Q-4, R-1, S-2
(B) P-4, Q-3, R-2, S-1
(C) P-3, Q-1, R-4, S-2
(D) P-2, Q-4, R-1, S-3

41. Vertical stratification in a tropical rainforest allows for high biodiversity primarily because:
(A) It acts as a structural barrier preventing apex predators from hunting
(B) It creates varied microhabitats for diverse species
(C) It forces organisms across all trophic levels to compete for identical resources

(A) Issue commercial logging permits and timber quotas directly to local tribal communities
(B) Market tribal Minor Forest Produce to improve rural livelihoods
(C) Strictly enforce statutory provisions of the Wildlife Protection Act within tribal zones
(D) Systematically relocate traditional forest tribes beyond core tiger reserve boundaries

62. Shifting cultivation, a traditional agricultural practice in forested hill tracts, is locally known in North-East India as:
(A) Bewar
(B) Jhum
(C) Podu
(D) Valre

63. How does the collection of Minor Forest Produce (MFP) impact the forest environment if done sustainably?
(A) It permanently strips upper forest canopy cover across harvesting zones
(B) It triggers rapid topsoil erosion throughout vulnerable sloped watersheds
(C) It provides local livelihoods without causing major deforestation
(D) It rapidly drives local keystone species toward widespread regional extinction

64. Forests act as a powerful natural defense against soil erosion. Which physical mechanism is most responsible for preventing 'splash erosion'?
(A) Deep structural taproots anchoring upper soil layers directly into bedrock
(B) Rapid atmospheric evaporation of surface moisture from leaf stomatal pores
(C) Secretion of specialized allelopathic chemicals by deep tree root networks
(D) Canopy interception of the kinetic energy of falling raindrops

65. Given below are two statements, one labelled as Assertion (A) and the other as Reason (R).
Assertion (A): Slopes with dense forest cover experience significantly fewer landslides than barren slopes.
Reason (R): Tree roots mechanically reinforce the soil mass and extract groundwater, reducing soil pore-water pressure.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

66. Identify the incorrect statement concerning forests and soil conservation.
(A) Forest litter layers on the ground absorb surface water runoff like a sponge
(B) Extensive plant root networks bind soil particles together, strengthening structure
(C) Deforestation reduces the sediment load entering nearby river systems
(D) Structural tree windbreaks prevent severe wind erosion of topsoil in arid zones

67. Gully erosion, a severe form of soil degradation, can be most effectively mitigated in a catchment area by:
(A) Executing intensive contour ploughing across sloped fields
(B) Afforestation and building check dams
(C) Applying heavy synthetic chemical fertilizers across exposed topsoil
(D) Systematically clearing all remaining native natural ground vegetation

68. The protective layer of decaying leaves, twigs, and bark on the forest floor is scientifically referred to as:
(A) Unconsolidated regolith
(B) Decomposed humus
(C) Sandy loam soil
(D) Duff or leaf litter

69. In mountainous terrains, the systematic planting of trees along contour lines to check soil erosion is known as:
(A) Contour afforestation
(B) Strip cropping technique
(C) Slope terracing system
(D) Seasonal crop rotation

70. How do forests scientifically contribute to mitigating global climate change?
(A) By continuously venting massive volumes of methane into the lower atmosphere
(B) By functioning as net emitters of carbon dioxide during ecosystem respiration
(C) By storing atmospheric carbon in woody biomass and soil carbon pools
(D) By expanding planetary surface albedo significantly beyond polar ice coverage

71. The 'Albedo Effect' refers to the reflectivity of the Earth's surface. Compared to a snow-covered field, a dense, dark coniferous forest generally has:

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91. Trees in a forest emit volatile organic compounds called phytoncides primarily to protect themselves from microbes and insects. How do these phytoncides impact human health when inhaled during a forest walk?
(A) They trigger acute, severe respiratory distress across most human individuals
(B) They cause irreversible genetic damage and alter cellular human DNA sequences
(C) They induce profound physical lethargy accompanied by acute sleep paralysis
(D) They enhance immune function by boosting natural killer cell activity

92. The aesthetic value of a forest primarily refers to:
(A) Total estimated market value derived from harvestable commercial timber
(B) Sensory pleasure from its natural beauty and tranquility
(C) The overall physical capacity of forest biomass to store atmospheric carbon
(D) Total volumetric yield of extractable medicinal herbs per land hectare

93. In environmental psychology, the 'Attention Restoration Theory' (ART) suggests that natural environments like forests help humans recover from:
(A) Severe physical skeletal muscle fatigue
(B) Chronic systemic nutritional deficiency
(C) Directed attention fatigue or mental strain
(D) Acute systemic airborne viral infections

94. Which of the following is an intangible benefit derived from forests?
(A) Commercial timber used for housing
(B) Tendu foliage harvested for bidi rolling
(C) Wild edible mushrooms collected for food
(D) Spiritual inspiration and peace

95. The Millennium Ecosystem Assessment (MEA) broadly classifies ecosystem services into four categories. Which of the following is NOT one of these categories?
(A) Provisioning ecosystem services
(B) Regulating ecosystem services
(C) Industrializing services
(D) Supporting ecosystem services

96. Under the classification of ecosystem services, the supply of timber, fuelwood, and medicinal plants falls under:
(A) Regulating services
(B) Provisioning services
(C) Cultural services
(D) Supporting services

97. The role of a forest in climate regulation, flood control, and water purification is classified as which type of ecosystem service?
(A) Provisioning services
(B) Cultural services
(C) Regulating services
(D) Supporting services

98. Ecosystem services that are necessary for the production of all other ecosystem services, such as soil formation, nutrient cycling, and primary production, are termed:
(A) Provisioning services
(B) Regulating services
(C) Cultural services
(D) Supporting services

99. Recreational activities, aesthetic enjoyment, and spiritual enrichment derived from forests belong to which category of ecosystem services?
(A) Provisioning services
(B) Cultural services
(C) Regulating services
(D) Supporting services

100. Given below are two statements, one labelled as Assertion (A) and the other as Reason (R).
Assertion (A): It is difficult to attach an exact monetary value to the regulating and supporting services of a forest.
Reason (R): These services do not produce tangible goods that are traded in traditional economic markets.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

101. Identify the Correct Pair of an ecosystem service and its MEA classification:
(A) Carbon sequestration — Cultural service
(B) Ecotourism — Provisioning service
(C) Honey collection — Regulating service
(D) Nutrient cycling — Supporting service

102. Forests contribute significantly to the national economy. However, official GDP figures often underestimate the true economic value of forests because:

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(A) Tulsi
(B) Brahmi
(C) Aloe Vera
(D) Giloy

82. Which part of the 'Giloy' (Tinospora cordifolia) plant, largely found climbing on forest trees, is predominantly used in Ayurveda for boosting immunity?
(A) Roots only
(B) Stem
(C) Flowers
(D) Seeds

83. Forests play a vital role in flood control. How does a forested watershed primarily attenuate (reduce) peak flood levels?
(A) By instantly absorbing all rainfall into the bedrock
(B) By increasing the velocity of surface runoff towards the main river channel
(C) By preventing rainfall from reaching the ground entirely
(D) By delaying the time of concentration and increasing soil infiltration

84. The strips of vegetation, usually forested, maintained alongside rivers and streams that help filter agricultural runoff and stabilize riverbanks are called:
(A) Riparian buffers
(B) Shelterbelt strips
(C) Silvopasture zones
(D) Contour vegetation

85. Arrange the following hydrological events in a forested watershed in the correct chronological order during a heavy rainfall event:
1. Soil infiltration
2. Canopy interception
3. Base flow to streams
4. Groundwater recharge
(A) 2, 1, 4, 3
(B) 1, 2, 3, 4
(C) 2, 4, 1, 3
(D) 4, 1, 2, 3

86. Which structural component of the forest is most responsible for slowing down the speed of overland water flow, thereby preventing flash floods?
(A) Upper canopy foliage and dense overhead leaves
(B) Undergrowth, ground vegetation, and leaf litter
(C) Smooth external bark covering mature tree trunks
(D) Widely spreading branches of high emergent trees

87. A hydrograph graphs the flow rate of a river over time. Compared to a deforested catchment, the hydrograph of a forested catchment after a storm will typically show:
(A) A higher and earlier peak
(B) No change in water level
(C) A negative flow rate
(D) A lower and delayed peak

88. What is the impact of excessive deforestation in the Himalayan catchments on the plains of Uttar Pradesh and Bihar?
(A) More severe monsoon floods and heavy river siltation
(B) Sharp regional drops in overall annual monsoon precipitation levels
(C) Complete natural elimination of all common regional agricultural pests
(D) Uninterrupted perennial river discharge rates sustained year-round

89. The Japanese practice of 'Shinrin-yoku' is globally recognized for the aesthetic and mental health benefits of forests. What does this term translate to?
(A) Forest burning
(B) Tree climbing
(C) Forest bathing
(D) Forest worship

90. Consider the following statements regarding the psychological impacts of forests:
I. Exposure to forest environments is scientifically linked to lowered blood pressure and reduced cortisol (stress hormone) levels.
II. Natural forest sounds can improve mood and cognitive focus.
III. Biophilia is the concept suggesting that humans possess an innate tendency to seek connections with nature.
IV. Prolonged exposure to forests significantly increases rates of urban anxiety.
Which combination of statements is correct?
(A) I, II, and III only
(B) I, II, and IV only
(C) II, III, and IV only
(D) I, III, and IV only

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Which of the above combinations is correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II and III

11. Which of the following forest products is extensively used in the traditional bidi-making industry of India?
(A) Sal leaves
(B) Palash leaves
(C) Teak leaves
(D) Tendu leaves

12. Timber value is often dependent on the durability and grain of the wood. Which Indian tree is universally renowned for its termite-resistant and highly durable timber?
(A) Eucalyptus
(B) Teak
(C) Poplar
(D) Neem

13. Find the odd one out in the context of direct forest produce categories.
(A) Fodder
(B) Medicinal herbs
(C) Climate regulation
(D) Honey

14. Forests provide significant indirect benefits through climate regulation. Which process allows trees to cool the surrounding local environment?
(A) Photorespiration
(B) Nitrogen fixation
(C) Capillary action
(D) Evapotranspiration

15. How do forests contribute directly to soil conservation?
(A) By binding soil with root systems and softening raindrop impact
(B) By continuously raising natural soil acidity to prevent harmful bacterial growth
(C) By extracting groundwater rapidly, keeping topsoil completely dry and compact
(D) By replacing depleted mineral reserves directly with fixed atmospheric nitrogen

16. What is the term for the canopy's ability to catch rainfall, thereby preventing it from hitting the soil surface with full force?
(A) Infiltration
(B) Interception
(C) Percolation
(D) Transpiration

17. The presence of dense forest cover modifies the local microclimate. Which of the following is a typical characteristic of a forest microclimate compared to an open field?
(A) Higher extreme daytime temperatures
(B) Reduced wind speed at ground level
(C) Lower relative humidity
(D) Increased frost formation

18. Forests help in mitigating the 'Urban Heat Island' effect primarily through:
(A) Providing shade and cooling air via evapotranspiration
(B) Reflecting virtually all incident solar radiation directly back into space
(C) Releasing stored heat and warming greenhouse gases during nighttime hours
(D) Significantly elevating the reflective surface albedo of urban concrete

19. Which of the following statements about forests and soil organic matter is correct?
(A) Forest fires are the only source of organic matter in soil.
(B) The presence of trees reduces the organic carbon content in the soil.
(C) Leaf litter decomposition significantly enriches the soil humus layer.
(D) Coniferous forests produce soil that is highly alkaline and rich in nitrogen.

20. Consider the following statements regarding the indirect benefits of forests:
I. They act as windbreaks, protecting adjacent agricultural crops from wind erosion.
II. They decrease the infiltration capacity of the soil, causing higher surface runoff.
III. They moderate local temperature fluctuations.
IV. They trap airborne particulate matter on leaf surfaces.
Which combination of statements represents the correct indirect benefits?
(A) I, II, and III only
(B) I, III, and IV only
(C) II, III, and IV only
(D) I, II, III, and IV

21. Forests play a critical role in maintaining the water cycle. Which mechanism allows forests to recharge groundwater tables?
(A) Accelerating the overall velocity of surface

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(A) Commercial timber harvest has no recognized financial market valuation anywhere in India
(B) Local consumption by forest dwellers is unrecorded in formal markets
(C) Forested ecosystems supply zero usable raw material inputs to domestic manufacturing industries
(D) International export of all forest-derived goods is illegal under national environmental statutes

103. Which major Indian industry relies almost entirely on bamboo and softwoods sourced from forests as its primary raw material?
(A) Iron and Steel Industry
(B) Petrochemical Industry
(C) Paper and Pulp Industry
(D) Information Technology Industry

104. The indirect contribution of forests to India's agricultural economy is primarily through:
(A) Directly supplying essential synthetic chemical fertilizers for agricultural crop fields
(B) Synthesizing high-yielding variety (HYV) crop seeds within specialized forest nurseries
(C) Supplying subsidized mechanical tractors and heavy farm machinery to local cultivators
(D) Conserving soil moisture, checking erosion, and supporting pollinators

105. 'Payment for Ecosystem Services' (PES) is a mechanism that involves:
(A) Compensating communities for actions that maintain forest ecosystem services
(B) Imposing heavy statutory fines on visiting tourists who litter within designated national park zones
(C) Levying direct municipal usage taxes on rural villagers collecting dry fallen wood for heating needs
(D) Auctioning protected national park lands directly to private commercial mining corporations for extraction

106. In India, the forestry sector's contribution to the Gross Domestic Product (GDP) is typically:
(A) Over 50%
(B) Less than 2%
(C) Around 20-25%
(D) Negative

107. Which of the following non-timber forest products constitutes a major export earner for India, heavily utilized in the food, cosmetic, and pharmaceutical industries?
(A) Sal logs
(B) Teak wood
(C) River sand
(D) Gums and Resins

108. Forests influence local rainfall patterns primarily by:
(A) Continuously emitting heat-trapping greenhouse gases into local air layers
(B) Releasing water vapor into the air via evapotranspiration
(C) Absorbing and dissolving rain clouds that pass directly above forest stands
(D) Generating persistent low-pressure atmospheric zones above the canopy cover

109. Trees emit Biogenic Volatile Organic Compounds (BVOCs). In the atmosphere, these compounds play a critical role in local weather by:
(A) Systematically degrading stratospheric ozone molecules in the upper atmosphere
(B) Inhibiting the natural atmospheric condensation of ambient water vapour droplets
(C) Serving as cloud condensation nuclei to promote rain formation
(D) Establishing static high-pressure atmospheric systems that suppress local storm activity

110. Match the mechanism in List I with its environmental effect in List II in a forest ecosystem.
List I: (Mechanism)
P. Canopy shade
Q. Leaf transpiration
R. Root penetration
S. Litter decomposition
List II: (Environmental Effect)
1. Increases soil porosity and water infiltration
2. Cools the local air by releasing moisture
3. Reduces ground temperature and evaporation from soil
4. Enriches soil with vital organic nutrients
(A) P-3, Q-2, R-1, S-4
(B) P-2, Q-3, R-4, S-1
(C) P-3, Q-1, R-2, S-4
(D) P-1, Q-2, R-3, S-4

111. What is the typical effect of large-scale deforestation on the local climate of a region?
(A) Promoting consistent, evenly distributed rainfall patterns across all seasons

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129. Scientific research in forests often involves 'phenological studies'. What does phenology refer to in this context?
(A) Investigating chemical mineral composition and nutrient profiles within forest topsoils
(B) Studying timing of seasonal biological events like flowering and leaf-fall
(C) Analyzing growth ring patterns in ancient fossilized timber to deduce historical climate
(D) Systematically discovering and describing new microscopic animal species in leaf litter

130. Select the correct logical order of scientific methodology when students conduct a forest biodiversity assessment:
(A) Data analysis → Setting up sampling plots (quadrats) → Identification of species → Hypothesis formulation
(B) Hypothesis formulation → Setting up sampling plots (quadrats) → Identification of species → Data analysis
(C) Identification of species → Data analysis → Hypothesis formulation → Setting up sampling plots
(D) Setting up sampling plots → Hypothesis formulation → Data analysis → Identification of species

131. Tree rings are often studied by scientists to understand past climatic conditions. What is this scientific field called?
(A) Dendrochronology
(B) Entomology
(C) Petrology
(D) Limnology

132. The degradation of forests leads to numerous adverse environmental impacts. Which of the following is a direct consequence of severe forest degradation?
(A) Substantially increased net yield of clean, potable freshwater
(B) Topsoil loss and elevated risk of desertification
(C) Dramatically elevated rates of long-term biological carbon sequestration
(D) Sharp overall reductions in atmospheric greenhouse gas concentrations

133. Habitat fragmentation, a major adverse effect of unscientific infrastructure development in forests, primarily causes:
(A) A rapid increase in localized population densities of large apex predatory carnivores
(B) Population isolation, lower genetic diversity, and elevated human-wildlife conflict
(C) The abrupt environmental conversion of dry deciduous forest biomes into moist evergreen stands
(D) An immediate and complete absolute cessation of all wind and water-driven topsoil erosion

134. How does the degradation of forest cover adversely affect agricultural productivity in adjacent areas?
(A) By blocking all local air movement completely, which deprives agricultural crops of necessary atmospheric gases
(B) Disrupting water cycles, lowering soil moisture, and losing natural pest predators
(C) By rapidly accumulating excessive organic matter levels that saturate topsoil and stunt root growth
(D) By triggering sharp, unnatural reductions in local ambient temperatures that freeze growing crops

135. Given below are two statements, one labelled as Assertion (A) and the other as Reason (R).
Assertion (A): Deforestation in tropical regions often leads to the laterization of soil, rendering it hard and infertile.
Reason (R): The removal of the forest canopy exposes the iron and aluminum-rich soil to heavy rainfall, washing away silicates and baking the remaining soil under the hot sun.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

136. Which invasive weed species is notoriously known for aggressively colonizing degraded forest lands in India, suppressing native biodiversity?
(A) Teak (Tectona grandis)
(B) Lantana camara
(C) Sandalwood (Santalum album)
(D) Sal (Shorea robusta)

137. The 'edge effect' is a phenomenon exacerbated by forest degradation. It refers to:
(A) Physical structural reinforcement of tree trunks situated along outer forest stand boundaries
(B) Population shifts at habitat boundaries favoring adaptable over interior species

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121. Joint Forest Management (JFM) is a concept that generates rural employment and ensures forest protection by:
(A) Contracting private logging corporations to conduct exclusive timber harvesting operations
(B) State forest departments partnering with communities to manage degraded land
(C) Stationing armed military units along administrative boundaries to guard reserve forests
(D) Enforcing strict legal statutes that permanently prohibit human entry into all reserves

122. Which traditional rural industry, prominent in northern and central India, relies heavily on the employment generated by collecting Tendu leaves from forests?
(A) Matchbox industry
(B) Bidi rolling industry
(C) Silk weaving industry
(D) Jute processing industry

123. The collection of 'Sal seeds' from forests provides seasonal employment primarily for:
(A) Manufacturing high-purity industrial chemical solvents for export markets
(B) Extracting Sal butter used in food and soap manufacturing
(C) Producing commercial-grade natural rubber for automotive tire production
(D) Synthesizing low-calorie artificial sweeteners for health food industries

124. Ecotourism in tiger reserves generates substantial indirect employment. Which of the following is an example of such employment?
(A) Organized illegal poaching and illicit trafficking of protected wildlife species
(B) Local employment as safari guides, drivers, and resort staff
(C) Large-scale clear-felling of mature forest trees to expand paved highway networks
(D) Commercial capture and international export of live exotic animal species

125. Consider the following statements about forest-based livelihoods:
I. Handicraft industries based on bamboo and cane provide significant livelihood opportunities in rural India.
II. Lac cultivation is heavily mechanised and provides zero rural employment.
III. The Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) includes provisions for afforestation and tree plantation works.
IV. Gathering medicinal herbs is often a critical supplementary income source for tribal women.
Which of the statements form the correct combination?
(A) I, II, and III only
(B) I, III, and IV only
(C) II, III, and IV only
(D) I, II, III, and IV

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126. Forests act as natural laboratories. What is the primary purpose of establishing 'Long Term Ecological Research' (LTER) sites within forest reserves?
(A) To maximize commercial timber yield extraction across extended multi-decade periods
(B) To track long-term ecosystem dynamics, biodiversity, and climate impacts
(C) To capture and train wild animal populations for commercial entertainment performances
(D) To systematically clear forested reserves to construct deep-space astronomical observatories

127. Which of the following subjects is predominantly studied through field excursions in forested environments by botany and forestry students?
(A) Quantum mechanics
(B) Silviculture and plant taxonomy
(C) Industrial metallurgy
(D) Computer algorithms

128. Educational excursions to forests primarily aim to inculcate which of the following among students?
(A) Instilling a deep-seated fear of wild animal species during field encounters
(B) Practical knowledge of ecology, conservation, and environmental stewardship
(C) Mastering mechanical methods and operational techniques for commercial logging
(D) Learning illegal strategies and deceptive methods for evading state forest laws

(B) Greater temperature extremes and erratic rainfall patterns
(C) Inducing a permanent drop in average daytime surface temperatures regionally
(D) Producing no measurable or observable alterations in local weather regimes

112. The term 'biotic pump' theory suggests that:
(A) Forest vegetation mechanically pumps deep groundwater up to surface channels
(B) Forest low-pressure zones draw ocean moisture inland to fuel rainfall
(C) Wild herbivore animal populations physically transport water across forest ecosystems
(D) Soil fungal networks circulate essential organic nutrients completely without water

113. In areas with dense forest cover, why is the threat of frost damage to understory plants generally reduced?
(A) Canopy foliage traps terrestrial heat radiation emitted at night
(B) Forest trees actively generate metabolic body heat comparable to warm-blooded mammals
(C) Forest soils naturally secrete organic chemical compounds that act as natural antifreeze
(D) Atmospheric frost can exclusively condense upon artificial man-made structural surfaces

114. The contribution of forests to maintaining groundwater levels is critically dependent on:
(A) The total, systematic removal of ground leaf litter layers across catchments
(B) Swift surface water runoff that funnels rainwater directly into ocean basins
(C) Constructing artificial concrete drainage channels alongside all natural streams
(D) Surface water residence time that allows aquifer infiltration

115. Consider the following statements regarding groundwater recharge in forests:
I. Deep-rooted trees create channels in the soil that enhance water percolation.
II. Deforestation hardens the topsoil, severely reducing the rate of groundwater recharge.
III. Afforestation with water-intensive, fast-growing exotic species like certain Eucalyptus can sometimes lower local water tables.
Which combination is correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II and III

116. A 'catchment area' in the context of forest hydrology refers to:
(A) A specialized industrial storage facility where harvested timber logs are kept
(B) Land area where precipitation collects and drains into a shared water body
(C) A enclosed fenced boundary designed specifically for capturing wild animals safely
(D) An administrative forest zone set aside exclusively for rural honey collection

117. Which of the following soil conditions in a healthy forest is most conducive to groundwater recharge?
(A) Highly compacted, bare soil
(B) Soil covered entirely by a layer of impermeable clay
(C) Porous soil rich in humus and organic matter
(D) Paved forest trails

118. The water table in a forested area is generally more stable year-round compared to an urban area primarily because:
(A) Forest plant communities consume zero volume of soil groundwater
(B) Urban built environments naturally receive far less total annual rainfall
(C) Deep root systems actively extract water directly from distant ocean basins
(D) Forests allow slow, sustained rainwater percolation

119. What term is used to describe the phenomenon where forest vegetation draws water from deep soil layers and redistributes it to shallower layers, benefiting smaller plants?
(A) Hydraulic lift (Hydraulic redistribution)
(B) Reverse osmosis
(C) Surface tension
(D) Guttation

120. Forests generate millions of jobs in India, mostly in the unorganized sector. Which of the following is a direct employment opportunity provided by the forestry sector?
(A) Writing custom software applications for enterprise IT firms
(B) Harvesting and processing Non-Timber Forest Products
(C) Commercial deep-sea marine fishing in international ocean waters
(D) Open-cast mineral mining operations

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(C) Abrupt localized drops in ambient air temperature occurring near boundary lines of clearings
(D) The administrative legal line dividing a designated national park from an adjacent sanctuary

138. The widespread clearing of forests, leading to the release of stored carbon and reduced capacity to absorb future carbon emissions, fundamentally contradicts which major global benefit of forests?
(A) Mineral extraction
(B) Climate change mitigation
(C) Urban real estate development
(D) Marine navigation

139. Forests serve as a natural shield against various disasters. Which type of forest acts as a crucial bio-shield protecting coastal areas from storm surges, cyclones, and tsunamis?
(A) Alpine forests
(B) Tropical dry deciduous forests
(C) Mangrove forests
(D) Coniferous forests

140. Arrange the following natural barriers from the highest altitude to the lowest altitude, regarding their role in disaster reduction:
1. Mangrove forests mitigating cyclonic waves
2. Alpine scrub reducing avalanche impacts
3. Deciduous forests controlling plains flooding
4. Montane coniferous forests stabilizing steep mountain slopes
(A) 2, 4, 3, 1
(B) 1, 3, 4, 2
(C) 4, 2, 3, 1
(D) 2, 3, 4, 1

141. In mountainous regions, deep-rooted forest trees significantly reduce the risk of which natural disaster?
(A) Explosive volcanic eruptions
(B) Severe tectonic earthquakes
(C) Snow avalanches and slope landslides
(D) Destructive atmospheric tornadoes

142. How do forests mitigate the severity of droughts?
(A) By physically deflecting incoming moisture-laden monsoon winds away from catchments
(B) By accelerating the immediate surface runoff velocity of sparse rain that falls
(C) Enhancing groundwater recharge and sustaining dry-season stream base flows
(D) By shutting down stomatal activity and halting all plant transpiration completely

143. During intense cyclonic winds, a dense 'shelterbelt' or 'windbreak' of trees helps primarily by:
(A) Physically deflecting and reversing the direction of incoming storm cyclones
(B) Absorbing cyclonic wind energy to reduce ground-level velocity
(C) Chemically neutralizing atmospheric turbulence through aerosol releases
(D) Generating localized air vacuums that siphon high-velocity winds upward

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144. Which of the following represents an incorrect relationship between forests and disaster management?
(A) Coastal forests amplify the destructive force of tsunamis.
(B) Forest fires, if unmanaged, can become severe disasters themselves.
(C) Deforestation generally increases the frequency and severity of flash floods.
(D) Deep tree roots stabilize soil on slopes, preventing mass wasting.

145. Match the traditional community practice in List I with its primary region or state in India in List II.
List I: (Traditional Practice)
P. Orans (Sacred groves providing fodder and water)
Q. Apatani wet rice and forestry system
R. Devrais (Sacred groves in Western Ghats)
S. Van Panchayats (Community forest management)
List II: (Region/State)
1. Maharashtra
2. Uttarakhand
3. Rajasthan
4. Arunachal Pradesh
(A) P-3, Q-4, R-1, S-2
(B) P-4, Q-3, R-2, S-1
(C) P-3, Q-2, R-1, S-4
(D) P-1, Q-4, R-3, S-2

146. Ethnobotany is a branch of science that relies heavily on the traditional knowledge of forest communities. What does it specifically study?
(A) Comprehensive genomic mapping and DNA sequencing of commercial timber trees
(B) Human-plant relationships and cultural uses for medicine, food, and rituals
(C) Geological preservation and paleobotanical

9. (C) Kattha
The heartwood of Acacia catechu, commonly known as Khair, is boiled and processed to extract Kattha, a key ingredient used in traditional pan preparations and herbal medicine. The extraction process yields both Kattha and Cutch as primary products. This commercial production forms an important forest-based industry in several Indian states, notably Uttar Pradesh and Himachal Pradesh.

10. (B) II and III only
Mahua flowers provide food and local beverage ingredients, while lac represents a natural resin secreted by Kerria lacca insects cultivated on host trees like Palash and Kusum. Legally, the Indian Forest Act amendment of 2017 exempted bamboo grown in non-forest areas from the definition of a tree, thereby facilitating its free cultivation, harvesting, and transportation by private landholders.

11. (D) Tendu leaves
Tendu leaves, harvested from Diospyros melanoxylon trees, possess ideal thickness, texture, and flexibility required for wrapping tobacco, forming the foundational raw material for India's traditional bidi-making industry. Central and northern Indian states collect massive quantities during pre-monsoon seasons, generating significant seasonal employment and minor forest produce revenues for forest-dwelling communities and state forest corporations.

12. (B) Teak
Teak, scientifically known as Tectona grandis, produces premium hardwood highly valued for its natural oil content, exceptional dimensional stability, and natural resistance to termites and decay-causing fungi. Its attractive grain pattern and structural durability make it the premier choice for marine construction, fine furniture, high-end joinery, and heavy structural timber applications globally across tropical regions.

13. (C) Climate regulation
Direct forest produce includes physical, tangible goods extracted directly from forest ecosystems, such as fodder, honey, medicinal plants, fuelwood, and timber. Climate regulation represents an indirect ecosystem service resulting from complex biological processes like carbon sequestration, microclimate modification, and evapotranspiration. It yields non-tangible environmental benefits rather than harvestable physical materials for direct economic trade.

14. (D) Evapotranspiration
Evapotranspiration combines plant transpiration and surface evaporation, transferring substantial amounts of water vapor into the surrounding atmosphere. This phase transition absorbs latent heat energy from the immediate environment, resulting in a cooling effect on surrounding air temperatures. Consequently, forested landscapes moderate local thermal extremes, maintain high relative humidity levels, and influence microclimatic conditions significantly compared to open lands.

15. (A) By binding soil with root systems and softening raindrop impact
Forests prevent soil erosion through multi-layered structural protections. Overhead foliage and branches intercept falling raindrops, absorbing kinetic energy to reduce splash erosion on bare ground. Concurrently, dense networks of tree and plant roots mechanically anchor soil particles together, enhancing soil structural stability, promoting water infiltration, and preventing topsoil wash-off caused by heavy rain events and surface runoff.

16. (B) Interception
Interception occurs when overhead plant foliage and branches capture incoming precipitation before it reaches the ground surface. This process dissipates the kinetic energy of raindrops, significantly reducing splash erosion on exposed topsoil. Trapped moisture either evaporates back into the atmosphere or slowly drips down via stemflow and canopy drip, effectively moderating surface water velocity and enhancing soil absorption.

17. (B) Reduced wind speed at ground level
Dense tree stands and multi-layered undergrowth act as physical barriers that impede airflow, leading to significantly lower wind speeds at ground level within forests compared to open fields. Additionally, the forest canopy buffers extreme temperature variations, elevates relative humidity through evapotranspiration, and shades the ground, thereby establishing a distinct, stable microclimate suitable for diverse understory species.

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Q. Rugged forested terrain
R. Forest streams/rivers
S. High altitude tree lines

List II: (Defensive Benefit)

1. Provides localized fresh water sources for forward posts
2. Conceals military infrastructure from aerial reconnaissance
3. Slows down mechanized infantry and tank columns
4. Offers natural fortification and camouflage for high-elevation outposts

(A) P-2, Q-3, R-1, S-4
(B) P-3, Q-2, R-4, S-1
(C) P-2, Q-1, R-3, S-4
(D) P-4, Q-3, R-1, S-2

156. The strategic importance of mangrove forests (e.g., Sundarbans) along maritime borders includes:
(A) Functioning as deep-water naval ports capable of housing heavy battleships
(B) Natural barriers blocking amphibious assaults and infiltration
(C) Maintaining wide, clear coastal observation zones for monitoring open ocean
(D) Supplying raw petroleum reserves utilized in fueling military marine vessels

157. The overall environmental balance of the Earth is heavily dependent on forests because they are major drivers of biogeochemical cycles. Which of the following cycles is NOT primarily driven by forest ecosystems?
(A) Carbon cycle
(B) Nitrogen cycle
(C) Water cycle
(D) Tectonic cycle (Rock cycle)

158. What does the term 'ecological homeostasis' mean in the context of a forest?
(A) The ecological condition wherein a forest canopy harbors zero native wildlife
(B) System stability and balance maintained despite external disturbances
(C) The total artificial eradication of all phytophagous insect pest populations
(D) The rapid transformation of natural mixed forests into monoculture plantations

159. A significant reduction in global forest cover is most likely to disrupt the environmental balance by:
(A) Significantly expanding planetary biodiversity across all terrestrial biomes
(B) Inducing a permanent, drastic lowering of global sea levels worldwide
(C) Accelerating climate change via increased atmospheric greenhouse gases
(D) Substantially increasing the density and thickness of stratospheric ozone

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160. Consider the following statements regarding the relationship between forest cover and overall environmental balance:
I. Forests act as buffers that moderate extreme weather events.
II. The loss of keystone species in a forest can lead to a cascading collapse of the local ecosystem.
III. Forests play a negligible role in the global oxygen supply compared to deserts.
IV. Nutrient recycling is rapidly accelerated in a healthy forest ecosystem.
Which combination is correct?
(A) I, II, and IV only
(B) I, III, and IV only
(C) II, III, and IV only
(D) I, II, III, and IV

161. In ecological terms, forests are considered 'climax communities' in many biomes. This means they are:
(A) Pioneer biological communities that first colonize entirely barren landscapes
(B) The final, stable stage of ecological succession under stable climate
(C) Transient, short-lived ecological communities that vanish within a single decade
(D) Specialized plant assemblages composed exclusively of invasive alien species

162. Which of the following best describes the 'synergistic effect' of forests on the environment?
(A) Forest stands yield usable timber exclusively during periods when carbon capture is zero
(B) Combined forest functions yield a total biosphere benefit exceeding individual parts
(C) Expanding tree cover directly competes with river systems for land, producing negative effects
(D) Large-scale tree clearing inevitably leads to complete regional desertification in one year

163. In the specific context of Uttar Pradesh, the Terai and Bhabar regions are known for their dense forests. Which dominant tree species in the Terai

region is highly valued for both its high-quality timber and its ecological role in tiger habitats?
(A) Teak (Tectona grandis)
(B) Sal (Shorea robusta)
(C) Sandalwood (Santalum album)
(D) Deodar (Cedrus deodara)

164. The Dudhwa National Park, located in the Lakhimpur Kheri district of Uttar Pradesh, is a prime example of which specific type of forest ecosystem?
(A) Terai moist deciduous forests and grasslands
(B) High-altitude alpine meadow ecosystems
(C) Arid subtropical desert thorn forests
(D) Coastal saline mangrove tidal forests

165. Given below are two statements, one labelled as Assertion (A) and the other as Reason (R).
Assertion (A): The social forestry programs implemented in the plains of Uttar Pradesh have significantly improved local availability of fuelwood and fodder.
Reason (R): Social forestry involves planting trees on barren lands, village commons, and alongside roads and canals, reducing the pressure on traditional reserve forests.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

166. In the Vindhyan region of Uttar Pradesh (districts like Sonbhadra and Mirzapur), the collection of which minor forest produce provides critical livelihood support to the local tribal populations during the summer months?
(A) Pine resin
(B) Tendu leaves
(C) Wild apples
(D) Rubber latex

167. Which of the following wetland/bird sanctuaries in Uttar Pradesh relies on the surrounding forest ecosystem to act as a crucial wintering ground for migratory birds and is designated as a Ramsar site?
(A) Nawabganj Bird Sanctuary
(B) Chilika Lake
(C) Keoladeo National Park
(D) Loktak Lake

168. As per the latest India State of Forest Report (ISFR), the forests of Uttar Pradesh play a crucial role in mitigating local pollution. Which region of UP generally reports the highest percentage of forest cover, thereby acting as the state's largest carbon sink?
(A) Western districts region (e.g., Mathura, Aligarh)
(B) Bundelkhand plateau region (e.g., Jhansi, Lalitpur)
(C) Terai and Vindhyan regions (e.g., Sonbhadra, Kheri)
(D) Central riverine plains region (e.g., Kanpur, Lucknow)

169. The forests of the Pilibhit Tiger Reserve in Uttar Pradesh provide which critical ecosystem service to the heavily populated agrarian plains located downstream?
(A) Extracting and supplying domestic crude oil to state refineries
(B) Watershed regulation for rivers like the Sharda and Gomti
(C) Generating industrial geothermal power sent to the state energy grid
(D) Commercial harvesting of diverse marine and estuarine fish varieties

170. The Uttar Pradesh Forest Department runs extensive plantation drives (e.g., planting crores of saplings in a single day). What is the primary environmental objective of these massive afforestation drives specific to the state's geography?
(A) Transforming the entire geographical state into a unified national park reserve
(B) Curbing pollution, halting ravine erosion, and expanding state green cover
(C) Harvesting structural timber exclusively for export to foreign European markets
(D) Clearing active agricultural farmlands to establish commercial logging operations

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ANSWERS

1. (B) A dynamic complex of living organisms and their environment functioning as a unit
A forest ecosystem represents a complex ecological unit consisting of biotic components like plants, animals, and microorganisms interacting dynamically with abiotic components such as soil, water, air, and sunlight. These interactions create a self-sustaining system characterized by energy flow, nutrient cycling, and structural stratification, functioning holistically across defined geographic areas to support life.

2. (A) Soil minerals
Ecosystems consist of biotic and abiotic factors that sustain life processes. Soil minerals represent inorganic, non-living chemical compounds essential for plant nutrition and growth, making them abiotic components. Conversely, decomposers, understory vegetation, and symbiotic fungi are biological entities that constitute the living, biotic portion of the forest system, actively contributing to food webs and biological processes.

3. (C) The canopy layer
The canopy layer forms the dense ceiling of a forest, composed of interlocking tree crowns that intercept maximum incoming solar radiation. Positioned high above the shrub, understory, and forest floor layers, it receives direct sunlight, driving intense photosynthetic activity. This layer protects lower strata from extreme heat and wind while creating shaded microclimates below.

4. (D) To break down dead organic matter and recycle essential nutrients into the soil
Saprophytic organisms, including fungi and specialized bacteria, act as vital decomposers within forest ecosystems. They break down complex organic compounds found in dead plant litter, fallen wood, and animal remains into simpler inorganic elements. This enzymatic degradation enriches topsoil fertility, maintains nutrient cycling, and prevents the accumulation of undecomposed organic matter across the forest floor.

5. (C) Ecotone
An ecotone is a distinct transition zone between two adjacent ecological communities or biomes, such as forests and grasslands. It features high species diversity and environmental gradient shifts due to the edge effect. Organisms from both neighbouring biomes often inhabit this overlapping region, alongside specialized species specifically adapted to the unique ecological conditions present within this boundary area.

6. (B) Autotrophs in a forest environment consist entirely of shade-tolerant plants.
Forest autotrophs comprise diverse photosynthetic organisms adapted to varying solar radiation intensities across structural layers. While understory species thrive in low-light conditions through shade tolerance, canopy and emergent trees require full overhead sunlight to synthesize organic matter. Thus, forest primary producers represent both shade-tolerant and sun-demanding plants distributed vertically according to their specific light requirements and adaptations.

7. (D) Tendu leaves
Non-Timber Forest Products comprise biological materials harvested from forests without cutting down trees for timber. Tendu leaves, gathered from Diospyros melanoxylon, represent a primary minor forest produce heavily utilized in the rural economy, particularly for rolling bidis. Unlike roundwood, sawn timber, or logs, harvesting leaves maintains forest canopy integrity while offering sustainable livelihood opportunities for indigenous communities.

8. (A) Pine trees (Pinus species)
Commercial resin is a valuable exudate obtained primarily from coniferous trees belonging to the genus Pinus, particularly Chir pine in India. Tapping resin involves making controlled incisions in the trunk wood. The extracted oleoresin undergoes distillation to produce turpentine oil and rosin, which are widely utilized in adhesives, pharmaceuticals, varnishes, paper sizing, and various chemical industries.

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study of ancient fossilized forests
(D) Chemical manufacturing processes used in synthesizing commercial artificial wood

147. Traditional knowledge systems among indigenous communities often promote sustainable harvesting. Which of the following is an example of a sustainable traditional practice?
(A) Executing complete clear-cutting of timber across an entire steep hillside ecosystem
(B) Gathering mature fruits or leaves while keeping roots and stems intact
(C) Applying chemical toxins to river systems to extract all aquatic life simultaneously
(D) Operating heavy mechanical earthmovers to harvest wild minor forest produce items

148. The Biological Diversity Act, 2002 of India acknowledges the traditional knowledge of local communities. It mandates the creation of which register at the local panchayat level to document this knowledge?
(A) National Register of Citizens
(B) People's Biodiversity Register
(C) State Forest Record Register
(D) Gram Sabha Revenue Register

149. Why is the protection of traditional ecological knowledge (TEK) considered vital for modern forest management?
(A) It generates renewable biofuels needed to operate heavy modern forestry machinery
(B) Time-tested local insights for biodiversity and climate resilience
(C) It strictly guarantees that forested zones remain entirely unvisited by human beings
(D) It assists urban planners in transforming natural wild forests into municipal parks

150. Consider the following statements about traditional knowledge and local practices:
I. Many traditional forest communities use controlled, low-intensity surface fires as a tool to clear dry brush and prevent massive, destructive forest fires.
II. Indigenous knowledge is uniform across all tribes in India.
III. Patenting of traditional medicinal knowledge by foreign pharmaceutical companies without benefit-sharing is known as 'Biopiracy'.
Which of the above statements is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II and III

151. Forests hold strategic importance for national security, particularly in border areas. How do dense border forests aid military defense?
(A) Completely blocking optical satellite imaging across national boundary zones
(B) Natural camouflage, concealment of troops, and physical obstacles
(C) Serving as natural geological repositories for harvesting weapon-grade uranium
(D) Rendering territorial boundaries entirely invisible on digital topographic maps

152. The 'Green Wall' or strategic afforestation along sensitive international borders is primarily aimed at:
(A) Developing specialized eco-tourism luxury facilities reserved for foreign diplomats
(B) Checking soil erosion, stopping illegal crossings, and masking defenses
(C) Harvesting and exporting high-grade structural timber directly to adjacent nations
(D) Cultivating populations of aggressive wild animals to attack border intruders

153. In high-altitude border regions like the Himalayas, forests provide critical logistical support to stationed armed forces primarily by:
(A) Directly manufacturing and supplying modern military weaponry to defense forces
(B) Slope stabilization against avalanches to keep supply roads open
(C) Generating industrial electricity supplies through sub-surface geothermal sources
(D) Serving as natural flattened emergency landing strips for heavy military aircraft

154. In counter-insurgency operations, dense tropical forests often present a challenge due to:
(A) Near-total absence of breathable atmospheric oxygen within understory layers
(B) Rugged terrain, poor visibility, and communication difficulties
(C) Powerful localized electromagnetic fields naturally emitted by large old trees
(D) Rapid environmental desertification that occurs immediately when troops enter

155. Match the strategic environmental features in List I with their corresponding defensive benefits in List II.
List I: (Strategic Feature)
P. Dense forest canopy

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18. (A) Providing shade and cooling air via evapotranspiration
Urban Heat Island effects occur when built environments absorb and retain thermal energy. Urban forests and tree canopies mitigate this warming by shading dark concrete surfaces and releasing moisture through evapotranspiration. This process absorbs heat during water evaporation, lowering ambient air temperatures, improving thermal comfort, reducing urban energy consumption for cooling, and enhancing overall ecological resilience within cities.

19. (C) Leaf litter decomposition significantly enriches the soil humus layer.
Forest floor litter consisting of fallen leaves, twigs, and bark undergoes continuous enzymatic breakdown by decomposers like fungi, bacteria, and detritivores. This biological process releases mineral nutrients and forms dark organic humus, which enhances soil structure, moisture retention capacity, and overall soil fertility. Consequently, healthy forest ecosystems maintain rich topsoils crucial for sustained plant growth and productivity.

20. (B) I, III, and IV only
Forests provide indirect benefits by acting as physical windbreaks, moderating extreme air temperatures, and trapping particulate pollutants on foliage surfaces. However, forest vegetation increases soil porosity and organic matter content, which enhances infiltration capacity and reduces surface water runoff, thereby mitigating soil erosion and downstream flood risk rather than decreasing infiltration capacity across forested catchments.

21. (C) Retarding surface water movement to promote natural soil infiltration
Forest vegetation, leaf litter, and extensive root networks impede the velocity of surface runoff generated during rainfall. By delaying water flow across the ground, forests allow water sufficient time to percolate into porous, organic-rich soil profiles. This deep infiltration replenishes subterranean aquifers, sustains groundwater supply, and maintains continuous base flows in local streams during dry periods.

22. (B) It is transpired into the atmosphere as water vapour.
Tree roots absorb extensive groundwater and nutrients from the soil to maintain cellular turgor and facilitate internal transport. Over ninety percent of this absorbed water moves through vascular xylem vessels to leaf tissues, where it evaporates into the atmosphere as water vapor through open stomata during transpiration, playing a fundamental role in driving regional hydrologic cycles.

23. (D) Lower peak flows in heavy rains and sustained dry-season base flow
Forested watersheds regulate stream hydrology by buffering intense precipitation events. Canopy interception and porous soil structure promote infiltration, thereby lowering storm peak discharges and preventing flash flooding. Subsurface water stores slowly discharge into stream channels during extended dry periods, sustaining steady base flows and maintaining river balance compared to the erratic hydrologic responses seen in deforested areas.

24. (A) Streamflow sustained by groundwater discharge between rains
Base flow represents the persistent portion of stream discharge fed by groundwater seepage rather than immediate storm runoff. In forested catchments, rainwater percolates deeply into aquifers due to high soil permeability. This stored underground water gradually discharges into river channels during dry intervals, maintaining perennial streamflow, supporting aquatic ecosystems, and preventing stream beds from drying completely.

25. (C) Flash floods in the downstream plains
Clearing forest vegetation on sloped mountain catchments removes protective foliage and root networks that regulate hydrology. Without canopy interception and absorbent organic soil, rainfall rapidly converts into heavy surface runoff. This accelerated overland flow swiftly enters river channels, carrying heavy sediment loads and triggering destructive flash floods in low-lying downstream plains during monsoon rainfall periods.

26. (A) Mangrove forests
Mangrove ecosystems thrive in intertidal saline coastal zones due to specialized physiological adaptations like pneumatophores and salt-excreting leaves. Their intricate prop root systems trap sediments, dissipate wave energy, and prevent coastal erosion. Additionally, mangroves function as critical hydrological

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forest-dependent indigenous populations across the country.

62. (B) Jhum
Jhum cultivation is the traditional indigenous practice of slash-and-burn farming practiced extensively in the hill regions of North-East India. Forest patches are cleared, vegetation is burned to release mineral nutrients into topsoil, and crops are cultivated for few seasons. The plot is then abandoned to allow natural forest fallow recovery while farming shifts to another location.

63. (C) It provides local livelihoods without causing major deforestation
Sustainable harvesting of Minor Forest Produce involves gathering non-timber items such as seeds, leaves, fruits, resins, and medicinal plants without felling mature trees or clearing vegetation. This practice supports local rural economies and traditional livelihoods, maintaining forest canopy cover, protecting topsoil, preserving wildlife habitat, and encouraging community-led conservation without causing large-scale deforestation or severe ecosystem degradation.

64. (D) Canopy interception of the kinetic energy of falling raindrops
Splash erosion occurs when high-velocity raindrops directly strike bare topsoil, dislodging soil aggregates and initiating soil erosion processes. Multi-tiered forest canopies, understory layers, and leaf litter physically intercept raindrops, absorbing their kinetic energy. Water subsequently drips gently onto the ground surface, significantly reducing soil detachment, protecting topsoil structure, and facilitating smooth water absorption into the soil.

65. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Dense forest cover mitigates landslide risks on steep mountain slopes. Tree roots bind soil particles together into a reinforced structural matrix, while transpiration extracts excess groundwater, significantly lowering sub-surface pore-water pressure. These combined mechanical and hydrological mechanisms stabilize soil layers, prevent slope failure, and minimize mass soil wasting during intense monsoon rainfall events.

66. (C) Deforestation reduces the sediment load entering nearby river systems
Deforestation exposes fragile topsoil to direct raindrop impact and unchecked surface runoff, leading to accelerated soil erosion. Dislodged soil particles are washed into streams, significantly increasing river sediment loads, clogging aquatic channels, and elevating downstream flood risks. Dense vegetation and root systems prevent topsoil detachment, maintaining clean water flows and suppressing excessive river sedimentation across natural catchments.

67. (B) Afforestation and building check dams
Gully erosion occurs when concentrated surface runoff carves deep channels into landscape topsoil. Planting deep-rooted trees stabilizes soil banks, reduces runoff velocity, and enhances water infiltration. Constructing check dams across gullies traps washed sediment, slows water flow, lowers channel gradient, and prevents further channel deepening, creating conditions suitable for vegetation recovery and long-term soil stabilization.

68. (D) Duff or leaf litter
The organic layer covering the forest floor, composed of freshly fallen and partially decomposed organic matter like leaves, twigs, bark, and seed pods, is termed leaf litter or duff. This layer acts as a physical protective blanket, absorbing raindrop impacts, reducing soil evaporation, protecting soil microfauna, and slowly decomposing to enrich topsoil with humus and nutrients.

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69. (A) Contour afforestation
Contour afforestation involves planting rows of trees and shrubs along precise lines of equal elevation across sloped terrain. This structural layout acts as a series of natural vegetative barriers that break the downhill flow of surface water, slow runoff velocity, trap eroded soil particles, enhance groundwater percolation, and effectively control water erosion across hilly landscapes.

70. (C) By storing atmospheric carbon in woody biomass and soil carbon pools
Forests help mitigate climate change by absorbing carbon dioxide during photosynthesis and converting it into stable carbon stocks. Sequestered carbon is locked long-term within woody trunks, root systems, leaf tissue, and

ecosystems, sequestered carbon is incorporated into plant tissues, trunk wood, root systems, and soil organic matter, effectively reducing atmospheric greenhouse gas concentrations and helping mitigate global climate change trends over extended timeframes.

36. (B) REDD+
REDD+ is an international framework developed under the United Nations Framework Convention on Climate Change. It provides economic incentives to developing nations to reduce greenhouse gas emissions caused by deforestation and forest degradation. Additionally, it encourages sustainable forest management, biodiversity conservation, and enhancement of forest carbon stocks to mitigate global warming through international financial mechanisms.

37. (B) Decay or burning of cleared trees releases stored carbon as CO_2
Forests store immense amounts of carbon in living biomass and soil. When forests are cleared, burned, or left to decay, the carbon locked within plant tissues reacts with oxygen, releasing carbon dioxide into the atmosphere. This sudden conversion shifts forests from carbon sinks into major carbon sources, directly escalating global greenhouse gas emissions and driving climate change.

38. (C) Sustainable selective logging with continuous afforestation
Sustainable selective logging combined with continuous afforestation maintains canopy cover, promotes forest regeneration, and prevents large-scale soil carbon loss. By removing individual mature trees while planting new ones, carbon continues to be sequestered in living biomass and durable timber products, maximizing long-term ecosystem carbon storage without causing catastrophic habitat degradation or carbon emissions associated with clear-cutting methods.

39. (B) Ecological Niche
An ecological niche defines the precise functional role, resource utilization, behavioral responses, and environmental requirements of a species within its habitat ecosystem. It encompasses dietary habits, reproductive timing, predator interactions, and specific environmental tolerances, distinguishing how a particular organism interacts with living and non-living components rather than simply describing where the organism physically resides within the forest.

40. (A) P-3, Q-4, R-1, S-2
India's protected national parks preserve distinct flagship fauna matched to specific forest biomes. Gir in Gujarat protects the last wild Asiatic lions, Kaziranga in Assam safeguards the great one-horned rhinoceros, Periyar in Kerala shelters Asian elephants within moist deciduous biomes, and Hemis in Ladakh serves as a high-altitude sanctuary for the elusive snow leopard across alpine mountain ecosystems.

41. (B) It creates varied microhabitats for diverse species
Tropical rainforests exhibit distinct vertical stratification, dividing structural space into emergent, canopy, understory, and floor layers. Each layer receives varying light, moisture, and airflow, creating distinct microhabitats. This spatial heterogeneity allows plants and animals to specialize in specific ecological niches, minimizing interspecific competition and enabling higher species diversity within a shared horizontal geographic footprint.

42. (B) Provide habitat for invertebrates, fungi, and cavity nesters
Fallen logs and deadwood form essential structural habitats within healthy forest ecosystems. Coarse woody debris provides shelter, moisture, and food for saproxylic insects, fungi, mosses, amphibians, and cavity-nesting birds. Furthermore, decaying wood slowly returns critical organic nutrients to forest topsoil, enhances moisture retention, and supports complex detrital food webs fundamental for sustaining overall ecosystem biodiversity.

43. (C) Endemic
An endemic species is ecologically restricted to a specific geographic region or habitat type and is found nowhere else naturally on Earth. Endemic forest species often evolve under unique isolated geographic or climatic conditions. Due to their restricted geographic range, these species are particularly vulnerable to habitat loss, climate fluctuations, and human disturbances, requiring focused conservation strategies for their survival.

44. (D) To enable wildlife movement and genetic exchange between populations
Wildlife corridors are continuous strips of natural forest habitat that connect isolated forest

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regulating functions, including climate regulation via carbon sequestration and transpiration, flood control through hydrological buffering, water purification via soil filtration, air pollution abatement, and soil erosion control, maintaining natural balance and safeguarding human settlements against environmental hazards.

98. (D) Supporting services
Supporting services comprise essential, foundational ecosystem functions necessary for producing all other ecosystem services. They operate over long timeframes and include primary biomass production, soil formation, nutrient cycling, and oxygen production. Without these continuous underlying biological and geochemical processes, provisioning, regulating, and cultural ecosystem services could not function or sustain human life on Earth.

99. (B) Cultural services
Cultural services encompass the non-material benefits individuals and communities gain from forest ecosystems through spiritual enrichment, cognitive development, outdoor recreation, aesthetic enjoyment, and artistic inspiration. Forests serve as foundational spaces for ecotourism, traditional cultural heritage, educational nature experiences, and mental health recovery, enriching human well-being without physical material depletion.

100. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Regulating and supporting services, such as soil conservation, climate regulation, and nutrient cycling, provide immense global ecological value. However, quantifying their exact financial worth is difficult because these ongoing ecosystem functions do not yield physical, priced commodities directly traded in traditional economic markets, often leading to their underestimation in standard national accounting frameworks.

101. (D) Nutrient cycling — Supporting service
Nutrient cycling is a supporting ecosystem service as it maintains soil fertility necessary for biomass production. Carbon sequestration is a regulating service, ecotourism is a cultural service, and honey collection is a provisioning service under the Millennium Ecosystem Assessment. Accurately categorizing ecosystem services helps quantify environmental values for sustainable natural resource management policies.

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102. (B) Local consumption by forest dwellers is unrecorded in formal markets
Official GDP metrics rely primarily on formal market transactions, undercounting the true economic value generated by forest ecosystems. Forest-dependent communities harvest vast quantities of fuelwood, fodder, wild foods, and medicinal herbs for direct subsistence and informal trade. Because these local consumption products bypass organized commercial markets, their immense economic value remains largely unrecorded in conventional national economic accounting.

103. (C) Paper and Pulp Industry
The paper and pulp industry relies heavily on forest resources, utilizing softwoods, bamboo, and hardwood species like Eucalyptus and Subabul as primary raw materials. Cellulosic plant fibers extracted from these forest woods undergo chemical pulping to produce diverse grades of paper, cardboard, and packaging products, demonstrating the direct economic links between forestry and industrial manufacturing sectors.

104. (D) Conserving soil moisture, checking erosion, and supporting pollinators
Forests indirectly support agricultural productivity by maintaining regional environmental stability. Forested catchments protect topsoil from erosion, regulate hydrological flows to maintain irrigation streams, recharge local water tables, and maintain ambient soil moisture. Furthermore, forests harbor wild pollinators, natural pest predators, and beneficial microfauna, ensuring sustained crop yields and long-term agricultural security across adjacent farming regions.

105. (A) Compensating communities for actions that maintain forest ecosystem services
Payment for Ecosystem Services is a conservation mechanism where beneficiaries of ecological functions pay landholders or local communities to manage land sustainably. By offering direct financial incentives, PES encourages communities to maintain forest canopy cover, conserve watersheds, and protect biodiversity, compensating them for economic opportunities foregone to preserve vital ecosystem services benefiting society at large.

53. (B) Local circulation of tourist spending that generates secondary jobs and income
The multiplier effect in ecotourism occurs when direct expenditure by visitors on local lodging, food, handicrafts, and guided tours re-circulates within the local economy. This initial spending generates secondary revenue streams and indirect employment for local farmers, transport operators, and artisans, thereby boosting regional economic development and providing strong economic incentives for forest communities to preserve wildlife.

54. (D) Building commercial resort developments
The core zone of a National Park is legally designated under wildlife protection laws to ensure inviolate spaces for wildlife breeding and ecological preservation. Human activities, including permanent commercial construction, resort development, mining, and timber logging, are strictly prohibited. Permissible ecotourism and educational activities are strictly regulated and restricted to designated buffer zones surrounding core habitats.

55. (C) I, II, and IV only
Eco-tourism offers alternative livelihoods for local residents, generates funds for park management, and promotes public environmental awareness. However, eco-tourism cannot guarantee a complete halt to human-wildlife conflicts, as animals may still stray into agricultural areas or human settlements surrounding protected reserves due to natural territorial movements, seasonal food searching, and changing ecological landscape factors.

56. (A) To let visitors view wildlife in natural habitats
A jungle safari is a regulated recreational and educational tour designed to allow visitors to observe wild animals and natural vegetation within their natural habitats. Safari operations follow non-intrusive paths in designated ecotourism zones, fostering wildlife conservation awareness, supporting field research, and raising park management revenue while strictly controlling human impact on animal behaviour and ecosystem health.

57. (C) Community-Based Tourism
Community-Based Tourism ensures that local residents directly manage tourism ventures and receive the financial revenues generated from eco-tourism activities. By empowering communities as primary stakeholders and financial beneficiaries, this model fosters local stewardship of natural resources, reduces economic reliance on destructive exploitation, and incentivizes active participation in forest protection and biodiversity conservation efforts across surrounding natural ecosystems.

58. (B) Recognize rights of forest-dwelling Scheduled Tribes and traditional dwellers
The Forest Rights Act of 2006 addresses historical injustices against forest-dwelling Scheduled Tribes and traditional forest dwellers by legally recognizing their customary rights over forest land and resources. It grants individual land titles for occupation, rights to hold and collect minor forest produce, and community forest rights, empowering local institutions to conserve and manage forest ecosystems sustainably.

59. (D) The Gram Sabha
Under the Forest Rights Act, the Gram Sabha serves as the statutory authority empowered to initiate the process for determining individual and community forest rights. It receives claims, examines local evidence, prepares map boundaries, and passes resolutions regarding forest land rights before submitting recommendations to sub-divisional and district-level committees for final formal verification and title issuance.

60. (A) Commercial timber logs
Minor Forest Produce encompasses non-timber forest resources harvested sustainably from forests, including bamboo, cane, wild honey, tendu leaves, medicinal herbs, resins, and gums. Commercial timber logs are classified as major forest produce due to the destructive nature of tree harvesting, requiring strict state silvicultural management, statutory extraction permits, and regulated forestry management practices.

61. (B) Market tribal Minor Forest Produce to improve rural livelihoods
TRIFED operates under the Ministry of Tribal Affairs to socio-economically empower tribal communities by marketing their non-timber forest produce and handcrafted items. It establishes fair market prices, eliminates predatory middlemen, sets up processing centers, and promotes retail networks like Tribes India, ensuring sustainable income generation and economic self-reliance for

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patches separated by human infrastructure or land conversion. These ecological bridges enable wild animals to migrate, forage, and find mates across larger landscapes. Facilitating gene flow between isolated populations reduces inbreeding depression, increases genetic diversity, and enhances long-term species survival against localized threats.

45. (A) I and II only
Tropical rainforests harbor over half of Earth's terrestrial species despite occupying limited land surface, while coastal mangroves act as critical nursery grounds for marine life. Conversely, monoculture timber plantations feature low structural diversity and species richness compared to complex natural mixed forests, making them far less effective for supporting diverse plant, animal, and microbial wildlife communities.

46. (B) Sacred Groves
Sacred groves are communally protected forest patches preserved through traditional cultural and religious beliefs. Local communities enforce strict prohibitions against tree felling, hunting, and resource extraction within these areas. Consequently, sacred groves act as vital refuges for endemic flora and fauna, serving as historic centers of biological conservation and preserving invaluable traditional ecological knowledge across diverse cultural landscapes.

47. (C) Peepal (Ficus religiosa)
Ficus religiosa, commonly known as the Peepal tree, holds immense cultural and religious significance across Hinduism, Buddhism, and Jainism. Historically associated with Buddha's enlightenment under the Bodhi tree, it is frequently planted near temples and sacred sites. Religiously protected from cutting, Peepal trees grow to immense sizes, providing vital habitat, shade, and food for wildlife species.

48. (A) Rajasthan
The Bishnoi community of Rajasthan is renowned for its historical commitment to environmental protection and wildlife conservation. Guided by religious tenets, community members historically sacrificed their lives, as exemplified by Amrita Devi Bishnoi in the historic Khejarli massacre, to prevent the cutting of Khejri trees. Today, they continue strictly protecting regional plant and animal species across desert ecosystems.

49. (C) Chota Nagpur Plateau
Sarhul is an important spring festival celebrated by tribal communities across the Chota Nagpur Plateau, including Munda, Oraon, and Ho tribes in Jharkhand and adjacent states. The festival marks the flowering season of Sal trees (Shorea robusta). Tribes worship the tree and nature spirits to invoke agricultural prosperity, ecological balance, and blessings for community well-being before planting crops.

50. (A) Sacred Groves → Community Reserves → Village Commons → Commercial Plantations
Sacred groves represent strict community conservation based on total spiritual prohibitions against resource extraction. Community reserves balance structured protection with managed local usage under legal frameworks. Village commons permit regulated community grazing and gathering for local needs. Commercial plantations represent the least culturally restrictive category, designed primarily for periodic economic harvesting rather than ecological or cultural preservation.

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51. (B) Local rural women clinging to trees to stop logging
The Chipko Movement originated in the Garhwal Himalayas during the 1970s as a non-violent ecological campaign against commercial deforestation. Rural villagers, prominently led by local women, hugged forest trees to physically prevent commercial contractors from felling them. This landmark environmental struggle highlighted traditional community rights over local forest resources and sparked nationwide ecological awareness regarding sustainable forestry policies.

52. (B) Minimizes ecological impact while supporting conservation and local communities
Ecotourism is responsible travel to natural areas that conserves the environment, minimizes visitor footprint, and improves the well-being of local people. Unlike conventional mass tourism, ecotourism emphasizes environmental education, biodiversity preservation, sustainable infrastructure, and community participation, ensuring that financial benefits directly support local livelihoods and long-term conservation initiatives in and around protected natural habitats.

subterranean soil organic matter pools. This biological removal reduces overall atmospheric greenhouse gas concentrations, helping regulate global thermal balance and climate systems.

71. (B) A lower albedo, absorbing more solar radiation
Albedo measures the reflectivity of a surface regarding incoming solar radiation. Snow-covered fields exhibit very high albedo, reflecting most sunlight back into space. Conversely, dense, dark coniferous forest canopies absorb significant amounts of incident solar radiation, resulting in a substantially lower albedo. This absorbed energy drives forest energy fluxes, transpiration, and localized temperature dynamics.

72. (D) High evapotranspiration rates transferring heat via water vapour
Despite having lower surface albedo and absorbing significant solar radiation, tropical rainforests exert a net cooling effect on global climate primarily through high evapotranspiration rates. Huge volumes of liquid water are transpired into the atmosphere as water vapor, absorbing latent heat energy from ambient air. This moisture generates persistent cloud cover that reflects incoming solar radiation.

73. (C) Peatland and Mangrove forests
Peatland and mangrove forests store the highest carbon densities per hectare among terrestrial ecosystems, predominantly stored in underground soil pools. Saturated, waterlogged conditions inhibit oxygen diffusion, slowing microbial decomposition of organic matter over millennia. Consequently, deep layers of rich organic soil accumulate, trapping immense amounts of long-term carbon beneath living vegetation structures.

74. (C) Both serve as major biological carbon sinks.
Both terrestrial forests and marine phytoplankton function as major primary producers and critical global biological carbon sinks. Terrestrial forests fix atmospheric carbon dioxide into woody biomass and deep soil layers, while phytoplankton absorb oceanic dissolved carbon dioxide through photosynthesis. Together, these systems capture billions of tons of carbon annually, driving global carbon cycling and regulating climate stability.

75. (A) P-2, Q-4, R-3, S-1
Carbon sequestration stores carbon in biological pools, afforestation establishes forests on non-forested lands, deforestation permanently removes trees for alternative land uses, and a carbon footprint measures total greenhouse gas emissions generated by human entities. These ecological definitions highlight crucial processes, policies, and impacts central to global climate change mitigation, forest management, and sustainability framework assessments.

76. (B) Cinchona tree (Cinchona species)
Quinine is an important antimalarial alkaloid compound extracted from the dried bark of trees belonging to the genus Cinchona, native to South American tropical forests. Introduced globally, Cinchona bark extracts historically served as the primary treatment for malaria infections, highlighting the significant role of forest biodiversity in yielding life-saving medicinal compounds for global public health.

77. (B) Taxol (Paclitaxel)
Taxol, generic name Paclitaxel, is an effective anti-cancer medication discovered in the inner bark of the Pacific Yew tree, Taxus brevifolia. It inhibits cancer cell growth by stabilizing cellular microtubules, preventing normal cell division. Its discovery highlights the immense pharmaceutical value of forest plant species and underscores the importance of biodiversity conservation for medical advancements.

78. (A) High blood pressure (hypertension)
Rauvolfia serpentina, commonly known as Sarpagandha, is a medicinal forest plant native to the Indian subcontinent. Its roots contain bioactive indole alkaloids, prominently reserpine, which acts on the central nervous system to lower blood pressure and manage severe hypertension. It has been utilized extensively in traditional Ayurvedic systems for treating circulatory and neurological conditions.

79. (C) Azadirachtin
Azadirachtin is the primary bioactive limonoid compound extracted from the seeds, leaves, and bark of the Neem tree, Azadirachta indica. It acts as a potent natural insecticide, antifeedant, and growth regulator against numerous agricultural pests. By disrupting insect metamorphosis and feeding behavior without harming beneficial

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pollinators, Azadirachtin forms the basis of eco-friendly biopesticide formulations worldwide.

80. (A) I and II only
Amla provides concentrated natural Vitamin C, while Ashwagandha root acts as an adaptogen in traditional medicine. However, medicinal plant harvesting in Indian forests is governed by strict environmental laws, biodiversity conservation regulations, and local community rights frameworks, requiring specific forestry permits to harvest protected wild species and prevent ecological overexploitation across state forest lands.

81. (C) Aloe Vera
Aloe Vera is a succulent forest and dryland plant characterized by thick, fleshy, mucilaginous leaves containing rich gel reserves. The gel exhibits anti-inflammatory, antimicrobial, and tissue-healing properties, making it widely utilized in traditional medicine and modern pharmaceutical industries for soothing skin burns, accelerating wound repair, aiding digestive health, and formulating cosmetic skincare products globally.

82. (B) Stem
Giloy, botanically identified as Tinospora cordifolia, is a climbing shrub common in Indian forests. In Ayurvedic practice, its succulent stem is the primary part utilized for formulating medicinal extracts, decoctions, and powders. Rich in alkaloids and glycosides, the stem enhances immune response, helps manage persistent fevers, removes toxins, and exhibits strong anti-inflammatory properties.

83. (D) By delaying the time of concentration and increasing soil infiltration
Forested watersheds attenuate peak flood discharges by intercepting heavy rainfall with dense canopies and accumulating water within porous, litter-covered soils. This delays water travel time across the catchment, increases soil infiltration rates, and lowers surface runoff velocity. Consequently, flood hydrographs exhibit lowered, delayed peak flows, mitigating severe flooding downstream during extreme storm events.

84. (A) Riparian buffers
Riparian buffers are vegetated, forested corridors situated directly along watercourses, streams, and riverbanks. These natural vegetative zones trap agricultural runoff, filter excessive nutrients and sediments, absorb pesticide residues, and stabilize stream bank soils against channel erosion. Additionally, riparian buffers maintain aquatic habitat quality by providing shade, lowering water temperatures, and supporting biodiversity corridors.

85. (A) 2, 1, 4, 3
During heavy rainfall, tree canopies first intercept incoming precipitation, absorbing kinetic energy. Water then reaches the ground and infiltrates through porous organic soil layers. As infiltration saturates subsurface soil profiles, excess water percolates deeper to recharge subterranean groundwater aquifers. Finally, stored groundwater gradually seeps into stream beds as sustained base flow over extended timeframes.

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86. (B) Undergrowth, ground vegetation, and leaf litter
Dense undergrowth, shrubs, ground cover plants, and accumulated leaf litter form physical obstacles along the forest floor that impede water movement. By creating micro-barriers, these ground structural elements dissipate surface runoff kinetic energy, slow overland flow velocity, prevent soil scour, and promote deep soil water infiltration, effectively checking sudden flash flood occurrences across watershed slopes.

87. (D) A lower and delayed peak
A hydrograph tracks river runoff discharge over time following rainfall. In a forested catchment, high soil infiltration, canopy interception, and floor litter resistance delay water movement into stream channels. Compared to deforested areas where water rapidly rushes overland, hydrographs of forested watersheds display a broader curve characterized by a significantly lower and delayed peak discharge.

88. (A) More severe monsoon floods and heavy river siltation
Deforestation across steep Himalayan catchments reduces canopy interception and root stabilization, accelerating topsoil erosion during monsoon rains. Heavy surface runoff rapidly carries immense quantities of dislodged silt into mountain streams, raising riverbed levels downstream in the plains of Uttar Pradesh and Bihar. This causes frequent, catastrophic

monsoon floods, severe riverbank erosion, and reduced reservoir storage capacity.

89. (C) Forest bathing
Shinrin-yoku is a traditional Japanese wellness concept translating directly to 'forest bathing'. It involves spending quiet, mindful time immersed in forest environments, engaging sensory connection with nature. Scientific studies demonstrate that practicing forest bathing lowers blood pressure, reduces stress hormones like cortisol, enhances immune system markers, and boosts overall psychological well-being through nature exposure.

90. (A) I, II, and III only
Natural forest environments lower stress metrics, reduce blood pressure, and enhance cognitive restorative processes. The biophilia hypothesis emphasizes humanity's innate biological affinity for natural systems. Consequently, immersion in forest environments reduces urban anxiety and psychological fatigue rather than elevating it, offering valuable mental health benefits through exposure to natural sights, pleasant sounds, and plant phytoncides.

91. (D) They enhance immune function by boosting natural killer cell activity
Phytoncides are antimicrobial organic compounds emitted by forest trees to defend against pests and pathogens. When humans inhale these volatile chemical compounds during forest walks, natural physiological responses are triggered. Studies demonstrate that phytoncide exposure increases human natural killer cell activity and elevates cancer-fighting protein production, boosting overall immune system functionality and stress recovery.

92. (B) Sensory pleasure from its natural beauty and tranquility
The aesthetic value of a forest represents the non-material appreciation derived from its visual scenery, natural tranquility, biodiversity, and landscape beauty. This non-extractive value enhances human psychological well-being, inspires artistic expression, and fuels eco-tourism appeal. Unlike commercial timber harvesting or resource extraction, aesthetic values provide intangible cultural and psychological benefits enjoyed by societies universally.

93. (C) Directed attention fatigue or mental strain
Attention Restoration Theory posits that urban environments require high levels of focused, directed attention, leading to cognitive mental fatigue. Natural environments like forests engage effortless, involuntary attention through natural scenery, enabling the brain's directed attention mechanisms to rest and recover. Consequently, forest exposure restores cognitive focus, improves working memory performance, and reduces mental exhaustion.

94. (D) Spiritual inspiration and peace
Tangible forest products include physical resources like structural timber, tendu leaves, fuelwood, and edible mushrooms, which are directly harvested for trade or consumption. Intangible forest benefits comprise non-material services such as spiritual inspiration, mental peace, aesthetic enjoyment, cultural heritage preservation, and climate regulation, which enhance human well-being without involving direct physical material extraction.

95. (C) Industrializing services
The Millennium Ecosystem Assessment categorizes global ecosystem services into four core functional domains: Provisioning services yielding extractable goods, Regulating services maintaining environmental balances, Cultural services offering non-material benefits, and Supporting services sustaining basic ecological processes like nutrient cycles. Industrializing services is not a recognized category under this comprehensive global scientific ecosystem framework.

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96. (B) Provisioning services
Provisioning services encompass all physical, harvestable products obtained directly from ecosystems. In forest environments, these include structural timber, fuelwood, medicinal herbs, fodder, edible wild fruits, and minor forest produce. These tangible goods are directly consumed or traded in economic markets, supporting human survival, rural livelihoods, industrial manufacturing inputs, and international commercial trade systems worldwide.

97. (C) Regulating services
Regulating services encompass environmental benefits obtained from the regulation of ecosystem processes. Forests perform critical

buffers, filtering land runoff and preventing saline seawater intrusion into vulnerable coastal aquifers, thereby safeguarding local freshwater supplies.

27. (D) Absorb carbon dioxide and release oxygen via photosynthesis
Forests are metaphorically termed the 'lungs of the Earth' due to their vital role in gas exchange within global biogeochemical cycles. During photosynthesis, green foliage absorbs atmospheric carbon dioxide and uses solar energy to synthesize organic matter, releasing molecular oxygen as a byproduct. This massive biochemical process maintains atmospheric oxygen levels necessary for aerobic respiration across terrestrial life.

28. (B) Photolysis of water in photosynthesis
During the light-dependent reactions of photosynthesis occurring within plant chloroplasts, absorbed solar light energy drives the photolysis of water molecules. This biochemical splitting of water yields electrons, hydrogen ions, and free molecular oxygen. The generated oxygen diffuses out through leaf stomata into the surrounding atmosphere, serving as the primary source of atmospheric oxygen produced by terrestrial plants.

29. (C) By trapping particles on leaf and bark surfaces
Trees act as natural air filters by physically intercepting airborne particulate matter on their broad leaves, fine hairs, cuticular waxes, and rough bark structures. Wind carrying dust, ash, and fine particulates loses speed when moving through forest canopies, allowing particles to settle onto plant surfaces. Subsequent rainfall washes these deposited pollutants into the soil, temporarily cleansing ambient air.

30. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Forests adjacent to urban areas clean ambient air by reducing harmful gaseous pollutants such as sulphur dioxide and nitrogen oxides. Plant leaves absorb these gaseous chemicals through open stomatal pores during routine gas exchange for photosynthesis. Once inside leaf tissues, these compounds are metabolised or neutralized, thereby effectively reducing air pollution levels in suburban and urban fringes.

31. (B) Small, hairy (pubescent) or rough leaves
Foliage exhibiting rough textures, complex surface architecture, or dense epidermal hairs possesses high surface area and friction coefficients that trap and retain airborne dust particles efficiently. Fine trichomes physically hold particulate matter on leaf surfaces, preventing easy wind resuspension until rainfall washes the accumulated particles down to the ground, making such species ideal for urban pollution abatement belts.

32. (B) It balances overall ecosystem respiration losses
In mature climax forests, gross primary productivity approaches a balance with total ecosystem respiration, which includes respiration from living trees, animals, and soil decomposers. Consequently, net oxygen production stabilizes near equilibrium. While younger forests exhibit higher net carbon absorption and oxygen release rates due to rapid growth, old-growth systems maintain high structural biomass and stable gas exchange dynamics.

33. (B) They store more carbon than they release over time
A carbon sink refers to an ecosystem that absorbs and retains greater quantities of atmospheric carbon dioxide through photosynthesis than it emits back through respiration, decay, and combustion over long temporal scales. Forests serve as primary terrestrial carbon sinks, accumulating organic carbon within wood biomass, foliage, fine roots, and subterranean organic soil layers globally.

34. (C) Soil organic matter and peat layers
Global forest carbon pools are distributed between living biomass, deadwood, litter, and soil. Soil organic matter, particularly within peatlands and boreal forest soils, represents the largest carbon pool. Low temperatures or waterlogged conditions suppress microbial decomposition, allowing organic carbon to accumulate and remain stably stored underground for centuries, far exceeding the carbon stored in living aboveground vegetation.

35. (B) Carbon sequestration
Carbon sequestration describes the process where atmospheric carbon dioxide is captured by photosynthesizing vegetation and securely locked into long-term organic carbon reservoirs. In forest

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106. (B) Less than 2%
In India's national accounts, the formal forestry and logging sector contributes less than two percent to the Gross Domestic Product. This statistical figure primarily accounts for timber and recorded produce, underrepresenting non-market subsistence collections, informal trade, and ecosystem regulating services like climate control, soil protection, and water regulation that support broader economic sectors.

107. (D) Gums and Resins
Gums and resins represent vital non-timber forest products harvested from species like Acacia, Boswellia, and Pinus. India exports substantial quantities of natural gums, including Guar gum and Karaya gum, which serve as essential thickeners, stabilizers, and emulsifiers in food processing, pharmaceutical production, cosmetics, paper sizing, and industrial oil-drilling operations globally.

108. (B) Releasing water vapor into the air via evapotranspiration
Forests influence regional precipitation patterns by pumping massive volumes of moisture into the atmosphere through continuous plant transpiration and surface evaporation. This evapotranspiration enriches atmospheric humidity and latent heat levels, promoting cloud formation and local convection currents. Consequently, extensive forest cover fosters regional rainfall cycles, helping maintain moisture balance across surrounding landscapes.

109. (C) Serving as cloud condensation nuclei to promote rain formation
Forest trees emit Biogenic Volatile Organic Compounds, such as isoprene and terpenes, into the lower atmosphere. Once released, these organic compounds oxidize to form fine secondary organic aerosols. These aerosols act as cloud condensation nuclei, offering surfaces upon which ambient atmospheric water vapor condenses to form cloud droplets, thereby directly facilitating local rain formation processes.

110. (A) P-3, Q-2, R-1, S-4
Forest mechanisms drive distinct environmental effects. Canopy shade reduces soil temperatures and surface evaporation, leaf transpiration cools local air through moisture release, root penetration enhances soil structure and water infiltration rates, while leaf litter decomposition enriches topsoil profiles with essential organic nutrients, collectively forming a functional self-sustaining forest environment.

111. (B) Greater temperature extremes and erratic rainfall patterns
Large-scale deforestation disrupts regional climate systems by eliminating canopy shading and evapotranspirational cooling. Without trees to transpire moisture and buffer thermal variations, surrounding areas experience increased daytime surface heating, wider diurnal temperature fluctuations, diminished atmospheric humidity, and disrupted precipitation patterns, leading to localized droughts, soil drying, and heightened climate vulnerability across landscapes.

112. (B) Forest low-pressure zones draw ocean moisture inland to fuel rainfall
The biotic pump theory proposes that high transpiration rates over dense natural forests condense vast quantities of atmospheric water vapor, creating localized low atmospheric pressure zones. This low pressure draws moist air currents from oceans far inland over continental landmasses, driving continuous atmospheric moisture transport and maintaining interior rainfall that would otherwise diminish distant from coasts.

113. (A) Canopy foliage traps terrestrial heat radiation emitted at night
Frost damage occurs when clear night skies cause rapid radiative cooling of ground surfaces. In forested areas, dense canopy foliage acts as an insulating thermal blanket, absorbing and re-radiating longwave heat radiation back toward the forest floor. This structural trapping raises ground-level nocturnal temperatures, buffering delicate understory plants against damaging frost conditions.

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114. (D) Surface water residence time that allows aquifer infiltration
Forest ecosystems support groundwater recharge by extending surface water residence time across catchments. Litter layers and complex root systems impede overland flow velocity, allowing rainwater prolonged contact with porous topsoil. This extended infiltration window enables water to percolate through soil horizons into subterranean aquifers, stabilizing water tables and sustaining dry-season base flows effectively.

133. (B) Population isolation, lower genetic diversity, and elevated human-wildlife conflict
Habitat fragmentation divides continuous forest ecosystems into small, isolated patches separated by human infrastructure. This spatial separation restricts animal movement, fragments breeding populations, and decreases genetic diversity over time. Furthermore, fragmented boundaries force wildlife to navigate human-dominated agricultural or urban spaces, sharply elevating instances of human-wildlife conflicts, crop raiding, and livestock predation.

134. (B) Disrupting water cycles, lowering soil moisture, and losing natural pest predators
Degrading forest cover severely impairs agricultural productivity in surrounding areas. Deforestation disrupts regional hydrological balance, leading to erratic rainfall, lower soil moisture retention, and reduced stream dry-season flows. Additionally, losing forest habitats eliminates beneficial wild pollinators and natural biological pest predators, causing increased crop pest outbreaks and declining overall agricultural yields.

135. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Deforestation in humid tropical regions causes severe soil laterization. Removing the protective forest canopy exposes iron- and aluminum-rich topsoils to heavy tropical rainfall, which leaches soluble silicates down the soil profile. Sunlight then bakes the remaining mineral-rich soil into a hard, impermeable, low-fertility crust, severely limiting agricultural activity and natural forest regeneration.

136. (B) Lantana camara
Lantana camara is an aggressive invasive alien shrub that has extensively colonized degraded forest lands across India. Possessing high reproductive capacity, allelopathic chemical secretions, and unpalatable foliage, it outcompetes native understory flora, forms dense impenetrable thickets, disrupts natural forest regeneration, reduces herbivore forage availability, and increases forest fire risks across diverse forest ecosystems.

137. (B) Population shifts at habitat boundaries favoring adaptable over interior species
The edge effect refers to changes in population structures and community diversity that occur at boundaries where distinct habitats meet. Forest fragmentation expands edge environments, altering microclimates through increased wind and light exposure. These altered edge conditions favor adaptable, generalist, or invasive species while harming specialized interior species that depend on stable, shaded canopy microhabitats.

138. (B) Climate change mitigation
Clearing forests converts major biological carbon sinks into active greenhouse gas emission sources. Trees release stored carbon during burning or decomposition, while losing the ecosystem capacity for future carbon sequestration. This acceleration of atmospheric carbon dioxide accumulation directly undermines global climate change mitigation efforts, highlighting the necessity of maintaining intact forest ecosystems worldwide.

139. (C) Mangrove forests
Mangrove forests serve as crucial coastal bio-shields against marine natural disasters. Their complex, dense aerial root networks dissipate wave energy, trap coastal sediments, and reduce storm surge heights generated by severe tropical cyclones and tsunamis. Protecting coastal human settlements, mangroves reduce shore erosion and buffer low-lying agrarian landscapes from destructive marine inundation.

140. (A) 2, 4, 3, 1
Natural forest biomes serve protective roles at decreasing topographic elevations. Alpine scrub stabilizes high-altitude slopes against snow avalanches above tree lines. Montane coniferous forests anchor steep mountain slopes, preventing landslides. Deciduous forests occupy foothill catchments, regulating river flows to check plain flooding. Finally, coastal mangrove forests buffer low-lying intertidal shorelines against cyclonic ocean waves.

141. (C) Snow avalanches and slope landslides
In mountainous regions, deep-rooted forest vegetation anchors slope soils and weathered rock layers, increasing structural slope stability. Tree trunks and dense canopies physically break snowpack continuity, dissipating snow movement energy and substantially reducing avalanche risks. By mechanical root binding and absorbing sub-surface groundwater, mountain forests prevent severe landslides and mudflows during intense monsoon rainfall.

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124. (B) Local employment as safari guides, drivers, and resort staff
Ecotourism operations within tiger reserves and national parks stimulate local economies by creating diverse non-extractive job opportunities. Local community members gain employment as certified nature safari guides, vehicle drivers, hospitality staff, park maintenance workers, and handicraft artisans, fostering economic incentives for local communities to support wildlife protection and forest conservation initiatives.

125. (B) I, III, and IV only
Cottage industries using bamboo and wild medicinal plant harvesting offer critical livelihoods, while MGNREGA funds public afforestation projects. Conversely, lac cultivation relies on labor-intensive traditional manual techniques, including host tree pruning, broodlac inoculation, and manual harvesting on trees like Kusum and Palash, generating significant seasonal employment for tribal farmers across central eastern India.

126. (B) To track long-term ecosystem dynamics, biodiversity, and climate impacts
Long Term Ecological Research sites are permanently established monitoring plots inside protected forest reserves designed to conduct continuous, multi-decade ecological research. Scientists systematically record environmental variables, forest growth dynamics, biodiversity shifts, carbon flux rates, and soil conditions to understand ecological succession and quantify long-term impacts of global climate change on forest ecosystems.

127. (B) Silviculture and plant taxonomy
Field excursions in forested environments provide forestry and botany students with hands-on training in silviculture and plant taxonomy. Students learn to identify plant species, analyze community structure, observe forest succession, evaluate timber growth metrics, and study natural regeneration patterns directly in natural habitats, bridging theoretical ecological concepts with practical forest management applications.

128. (B) Practical knowledge of ecology, conservation, and environmental stewardship
Educational forest excursions aim to provide experiential learning opportunities that foster deep understanding of ecological concepts, biodiversity conservation, and natural resource stewardship. By observing ecosystem interactions, structural layers, and human-nature relationships firsthand, students develop environmental literacy, ethical responsibility, and scientific knowledge essential for addressing environmental challenges and supporting sustainable conservation policies.

129. (B) Studying timing of seasonal biological events like flowering and leaf-fall
Phenology is the scientific study of recurring biological life cycle events and their timing in relation to seasonal climatic variations. In forest ecology, phenological studies track plant events such as bud burst, leaf flushing, flowering, fruiting, and leaf senescence. Monitoring these periodic biological events helps scientists assess ecosystem responses to shifting temperatures and global climate change.

130. (B) Hypothesis formulation → Setting up sampling plots (quadrats) → Identification of species → Data analysis
Conducting a scientific biodiversity assessment follows a structured methodology. Researchers formulate a clear scientific hypothesis, establish standardized sampling plots or quadrats across field study sites, systematically identify and record species within those boundaries, and finally analyze collected biological data using statistical ecological indices to evaluate species richness and ecosystem diversity patterns.

131. (A) Dendrochronology
Dendrochronology is the scientific discipline that analyzes annual tree ring growth patterns in woody trees. Because tree ring width varies based on temperature and precipitation during growing seasons, dendrochronologists reconstruct historical climate variations, date ancient wooden structures, trace natural disturbance histories like forest fires, and analyze long-term environmental changes across centuries.

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132. (B) Topsoil loss and elevated risk of desertification
Severe forest degradation removes protective canopy cover and root systems, exposing vulnerable topsoils to accelerated water and wind erosion. The loss of organic matter and reduced water infiltration capacity diminish soil fertility, leading to soil compaction, land degradation, and heightened desertification risk, which degrades ecosystem productivity and threatens surrounding agricultural systems.

8. Which of the following best defines an 'endemic species'?
(A) A wide-ranging species that regularly migrates across multiple continents throughout its annual life cycle
(B) A highly adaptable species that has successfully established self-sustaining populations in urban environments globally
(C) A species restricted exclusively to a specific geographic region
(D) An introduced exotic species that rapidly establishes and becomes invasive in a new non-native habitat

9. What is the primary purpose of designating a species as an 'umbrella species' in conservation planning?
(A) To protect a prominent keystone animal that specifically builds physical nesting shelter for smaller dependent organisms
(B) To identify and preserve sensitive flora and fauna species that exclusively survive under the dense canopy of primary tropical rainforests
(C) To select highly resilient biological species that demonstrate natural immunity to extreme climatic variations and shifting rainfall patterns
(D) To protect a species with large habitat requirements, indirectly sheltering co-occurring species

10. Match List I with List II**:**
List I: (Ecological Concept)
P. Genetic Diversity
Q. Species Diversity
R. Ecosystem Diversity
S. Ecotone
List II: (Definition)
1. The variety of different habitats, communities, and ecological processes
2. A transition area between two distinct biological communities
3. The variation of genes within a particular species
4. The number and abundance of different species within a region
(A) P-3, Q-4, R-1, S-2
(B) P-4, Q-3, R-2, S-1
(C) P-3, Q-1, R-4, S-2
(D) P-1, Q-4, R-3, S-2

11. How does the loss of biodiversity directly impact human populations?
(A) It significantly expands the availability of fertile arable land suitable for large-scale commercial agriculture globally
(B) It reduces ecosystem resilience, threatening food security and natural medicine supply
(C) It permanently stabilizes macro-climatic conditions and localized seasonal weather patterns across affected ecological zones
(D) It completely eliminates the transmission pathways and operational risks of emerging zoonotic diseases in human communities

12. Which of the following is considered the most significant threat to global wildlife biodiversity today?
(A) Legal sport hunting
(B) Habitat destruction and fragmentation
(C) Overpopulation of large herbivore species
(D) Establishment of zoological parks

13. The Wildlife (Protection) Act was enacted by the Parliament of India in which of the following years?
(A) 1927
(B) 1972
(C) 1980
(D) 1986

14. Under the Wildlife (Protection) Act, 1972, what is the legal status of species listed in Schedule I?
(A) They can be legally hunted for sport or utility freely in any non-protected territorial forest zone
(B) They are permanently classified as vermin and can be systematically culled by authorized state government officers
(C) They receive absolute protection, with offences incurring the highest legal penalties
(D) They can be traded and transported commercially across state boundaries without acquiring any prior government permit

15. Given below are two statements, one labelled as Assertion (A) and the other as Reason (R).
Assertion (A): The Wildlife (Protection) Act, 1972 prohibits the hunting of all wild animals specified in Schedules I, II, III, and IV except under specific legally defined conditions.
Reason (R): The Chief Wildlife Warden may permit the hunting of any such animal if it has become dangerous to human life or is disabled beyond recovery.
(A) Both Assertion (A) and Reason (R) are true

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142. (C) Enhancing groundwater recharge and sustaining dry-season stream base flows
Forests mitigate drought severity through effective hydrological regulation. Forest soils intercept precipitation, slow down surface runoff, and promote deep infiltration into subterranean aquifers during rainy periods. This accumulated groundwater slowly seeps into river networks during dry seasons, sustaining base flows, maintaining soil moisture reserves, and buffering ecosystems against extended drought conditions.

143. (B) Absorbing cyclonic wind energy to reduce ground-level velocity
Shelterbelts and windbreaks are engineered rows of trees planted perpendicular to prevailing winds. During extreme cyclonic storms, dense vegetative foliage acts as a physical barrier that absorbs, breaks, and deflects high-velocity air currents. This mechanical resistance significantly reduces ground-level wind speed, protecting adjacent agricultural crops, topsoils, and infrastructure from wind damage.

144. (A) Coastal forests amplify the destructive force of tsunamis.
Coastal forest ecosystems like mangroves, beach forests, and tidal woodlands reduce the impact of tsunami waves rather than amplifying them. Their dense trunks, aerial prop roots, and vegetative canopies absorb hydraulic wave energy, reduce inland flow velocity, trap debris, and lower inundation heights, functioning as vital biological shields that protect coastal human communities.

145. (A) P-3, Q-4, R-1, S-2
Traditional community conservation practices are distributed across India. Orans provide sacred grove grazing protection in arid Rajasthan, the Apatani tribe practices integrated rice-forestry systems in Arunachal Pradesh, Devrais represent sacred forest groves in the Western Ghats of Maharashtra, and Van Panchayats function as historic democratic community forest management institutions across Uttarakhand.

146. (B) Human-plant relationships and cultural uses for medicine, food, and rituals
Ethnobotany is the scientific study of relationships between human societies and regional plant diversity. It investigates how indigenous and traditional communities perceive, classify, manage, and utilize wild plants for food, herbal medicine, shelter, dyes, tools, and spiritual rituals, documenting traditional ecological knowledge essential for modern pharmacology, agriculture, and biodiversity conservation.

147. (B) Gathering mature fruits or leaves while keeping roots and stems intact
Traditional forest practices support sustainable resource extraction by gathering non-destructive plant parts, such as mature fruits, seeds, or leaves, while leaving root structures and main stems intact. This selective harvesting allows plants to regenerate, preserves canopy cover, maintains forest biodiversity, and guarantees long-term supply of non-timber forest products without causing ecological degradation.

148. (B) People's Biodiversity Register
The Biological Diversity Act of 2002 mandates local Biodiversity Management Committees to prepare People's Biodiversity Registers at local authority levels. These comprehensive registers document localized traditional ecological knowledge, traditional medicinal usages, biological resource availability, and land-use practices, ensuring legal protection, preventing biopiracy, and securing equitable benefit-sharing for local communities regarding biological resources.

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149. (B) Time-tested local insights for biodiversity and climate resilience
Traditional ecological knowledge offers time-tested, location-specific insights into natural resource management, seasonal biological patterns, species interactions, and climate adaptation strategies. Integrating local indigenous practices with modern forestry science enhances biodiversity conservation, strengthens ecosystem resilience against climate change, promotes sustainable harvesting, and fosters active community participation in long-term forest stewardship.

150. (C) I and III only
Controlled surface burning by local communities reduces dry forest litter, minimizing catastrophic wildfire risks, while unauthorized commercial patenting of indigenous knowledge constitutes biopiracy. However, traditional knowledge is highly variable across tribal communities, reflecting distinct regional ecological conditions, localized floral species availability, unique

absorbing industrial emissions and regulating environmental balance.

169. (B) Watershed regulation for rivers like the Sharda and Gomti
Pilibhit Tiger Reserve's dense Terai forests provide critical watershed protection services for northern Uttar Pradesh. Acting as a natural hydrological sponge, these forested catchments collect monsoon precipitation, prevent soil erosion, recharge subterranean aquifers, and sustain base flows for major rivers like the Sharda and Gomti, securing water resources for agricultural plains downstream.

170. (B) Curbing pollution, halting ravine erosion, and expanding state green cover
Massive annual tree plantation campaigns in Uttar Pradesh aim to expand state forest and tree cover toward national policy targets. Strategically planting native saplings along river basins, degraded lands, and urban fringes curbs industrial air pollution, arrests active ravine erosion along Yamuna and Chambal catchments, restores degraded soils, and enhances regional climate resilience.

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of biological carbon sinks increases atmospheric greenhouse gas concentrations, accelerating global warming, altering hydrological cycles, exacerbating topsoil degradation, and driving widespread species extinction across degraded biomes worldwide.

160. (A) I, II, and IV only
Forests regulate microclimates, prevent ecosystem collapse by supporting keystone species, and facilitate rapid nutrient cycling. However, deserts generate minimal global oxygen due to sparse plant cover, whereas global forests, particularly tropical rainforests, generate significant atmospheric oxygen through high photosynthetic activity, making them primary contributors to global oxygen dynamics compared to hyper-arid biomes.

161. (B) The final, stable stage of ecological succession under stable climate
A climax community represents the final, self-perpetuating stage of ecological succession achieved by a plant community under stable regional climatic conditions. In many biomes, mature forests represent climax communities characterized by complex canopy structures, high species diversity, balanced primary productivity and respiration, and persistent ecological stability unless altered by major disturbances.

162. (B) Combined forest functions yield a total biosphere benefit exceeding individual parts
The synergistic effect of forests implies that combined ecological services—such as simultaneous carbon storage, microclimate moderation, water filtration, soil stabilization, and biodiversity protection—yield cumulative biosphere benefits far exceeding the simple sum of individual functions, maintaining planetary ecological health through interconnected biological and hydrological feedback mechanisms.

163. (B) Sal (Shorea robusta)
Shorea robusta, commonly known as Sal, is the dominant tree species in the Terai and Bhabar forest belts of Uttar Pradesh. Sal trees produce exceptionally strong, durable timber used for heavy construction. Ecologically, these dense Sal forests provide vital canopy cover, forage, and habitat structures for endangered wildlife, including Bengal tigers and Asian elephants.

164. (A) Terai moist deciduous forests and grasslands
Dudhwa National Park in Lakhimpur Kheri district represents the Terai eco-zone, characterized by moist deciduous Sal forests, tall alluvial marshland grasslands, and riparian swamps. This ecosystem provides habitat for endangered species, including the Royal Bengal tiger, Indian single-horned rhinoceros, swamp deer, and diverse migratory bird populations across northern Uttar Pradesh.

165. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Social forestry initiatives in Uttar Pradesh have increased rural fuel and fodder availability by establishing tree plantations on community lands, canal banks, roadsides, and wasteland patches. By meeting rural biomass demands through local community plantations, these programs reduce human resource pressure and illegal extraction activities within traditional reserved forest ecosystems.

166. (B) Tendu leaves
In the Vindhyan forest belt of Uttar Pradesh, encompassing Sonbhadra and Mirzapur districts, collecting Tendu leaves provides crucial seasonal income for tribal communities during hot summer months. Collected leaves are sold through state minor forest produce cooperatives, providing economic support before monsoon agricultural activities commence across these dry deciduous forest regions.

167. (A) Nawabganj Bird Sanctuary
Nawabganj Bird Sanctuary, located in Unnao district, Uttar Pradesh, is a designated Ramsar site consisting of wetland and surrounding forest habitats. The sanctuary serves as a vital wintering ground for diverse migratory waterfowl traveling along the Central Asian Flyway, providing essential roosting, feeding, and nesting spaces within its protected forested aquatic environment.

168. (C) Terai and Vindhyan regions (e.g., Sonbhadra, Kheri)
According to the India State of Forest Report, districts in the Terai belt like Lakhimpur Kheri and Vindhyan plateau regions like Sonbhadra contain the highest forest cover in Uttar Pradesh. These dense moist and dry deciduous forests function as the state's largest carbon sinks,

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cultural traditions, and historically diverse natural resource usage practices.

151. (B) Natural camouflage, concealment of troops, and physical obstacles
Dense forests along international border areas offer strategic military utility. Multi-tiered forest canopies provide natural visual and aerial camouflage, concealing defense infrastructure, personnel movements, and installations from enemy reconnaissance. Furthermore, rugged forested terrain creates natural physical obstacles that slow vehicular movement, aiding territorial defense, surveillance operations, and national border security strategies.

152. (B) Checking soil erosion, stopping illegal crossings, and masking defenses
Strategic afforestation and 'Green Walls' established along sensitive border zones serve dual ecological and security purposes. Dense vegetative belts reduce wind and water soil erosion while forming physical natural barriers that deter illegal cross-border movement. Additionally, continuous forest belts mask defensive military infrastructure and forward outposts from enemy surveillance across border regions.

153. (B) Slope stabilization against avalanches to keep supply roads open
High-altitude mountain forests provide logistical support to armed forces deployed in border regions. Deep root systems anchor steep mountain slopes, preventing soil landslides and rockfalls. Additionally, dense forest canopies absorb kinetic snow movement, minimizing avalanche risks. This slope stabilization maintains open operational highways, ensuring reliable transport of military supplies and personnel.

154. (B) Rugged terrain, poor visibility, and communication difficulties
Conducting counter-insurgency operations within dense tropical forests presents severe tactical challenges for security forces. Dense canopies significantly restrict line-of-sight visibility, hamper satellite navigation signals, and disrupt radio communications. Furthermore, rugged terrain and thick undergrowth limit vehicular mobility, favoring guerrilla tactical operations and complicating troop logistics, air support, and ground surveillance.

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155. (A) P-2, Q-3, R-1, S-4
Strategic environmental features provide specific defensive military benefits. Dense canopies conceal infrastructure from aerial visual inspection, rugged terrain delays heavy mechanized infantry advance, forest streams offer essential freshwater supplies for forward posts, and high-altitude tree lines provide natural physical cover and camouflage for high-elevation defense positions along mountainous borders.

156. (B) Natural barriers blocking amphibious assaults and infiltration
Mangrove ecosystems along maritime borders, such as the Sundarbans, provide natural coastal defense. Their dense aerial roots, tidal mudflats, and intricate river networks form impenetrable natural barriers that impede amphibious landings and illicit border infiltration. Furthermore, mangroves protect coastal radar and border posts by buffering high-energy storm surges and coastal erosion.

157. (D) Tectonic cycle (Rock cycle)
Forest ecosystems drive biological and atmospheric biogeochemical cycles, including the carbon, water, oxygen, and nitrogen cycles, through plant metabolism, transpiration, and organic decomposition. However, the tectonic cycle is governed by deep interior Earth geodynamic processes, including plate movements and mantle convection, operating independently of biological surface processes and forest cover.

158. (B) System stability and balance maintained despite external disturbances
Ecological homeostasis describes the continuous internal self-regulation and structural stability maintained by an ecosystem despite environmental disturbances like fires, storms, or pest outbreaks. In healthy forests, complex food webs, species diversity, biological feedback loops, and efficient nutrient recycling mechanisms enable the system to absorb environmental stresses, maintain functional equilibrium, and recover naturally.

159. (C) Accelerating climate change via increased atmospheric greenhouse gases
Significant reductions in global forest cover disrupt environmental balance by releasing stored carbon into the atmosphere and reducing photosynthetic carbon capture. This rapid loss

CHAPTER 12
Forest and Wildlife Conservation

1. What is the primary objective of the sustainable yield concept in forest conservation?
(A) To maximize short-term timber extraction for economic growth
(B) To harvest forest resources at a rate that allows for natural regeneration
(C) To completely ban all forms of human access to forest lands
(D) To convert natural forests into high-yielding monoculture plantations

2. Which of the following best describes the ecological function of a riparian forest?
(A) It exists primarily in arid deserts to prevent sand dune shifting
(B) It is a high-altitude coniferous forest found above the timberline
(C) It is an artificial plantation grown specifically for industrial timber
(D) It is a forested or wooded area of land adjacent to a body of water such as a river or stream

3. What is the fundamental difference between afforestation and reforestation?
(A) Afforestation is the creation of a new forest where there was none historically, while reforestation is restoring a depleted forest
(B) Afforestation is planting trees in urban areas, while reforestation is planting in rural areas
(C) Afforestation involves planting exotic species, while reforestation involves indigenous species
(D) Afforestation is done for commercial timber, while reforestation is purely for wildlife habitat

4. In the context of forest ecosystems, what does the term 'carbon sequestration' primarily refer to?
(A) The release of carbon dioxide during forest fires
(B) The process of converting organic carbon into fossil fuels underground
(C) The long-term storage of carbon in plants, soils, and geologic formations
(D) The emission of methane gas from decaying forest floor litter

5. Why are old-growth forests considered highly valuable for biodiversity conservation?
(A) They contain diverse habitats and undisturbed ecological niches
(B) They possess a uniform age structure that significantly simplifies long-term timber management
(C) They consist exclusively of fast-growing and commercially highly valuable hardwood species
(D) They require substantially fewer soil nutrients and less annual rainfall than secondary forests

6. Which of the following is an indirect benefit of maintaining healthy forest cover in a watershed area?
(A) Immediate and sustained increase in local commercial timber sales and export revenue
(B) Complete and permanent elimination of naturally occurring seasonal wildfire risks
(C) Rapid geological conversion of underlying subsoil minerals into commercially usable ores
(D) Prevention of soil erosion and regulation of downstream water flow

7. In wildlife conservation, what is the significance of protecting a 'keystone species'?
(A) It is usually the most aesthetically appealing species that primary attracts local eco-tourism
(B) Its presence is critical to maintaining overall ecosystem structure and balance
(C) It possesses the highest monetary market value in regulated international wildlife trade
(D) It is strictly a top-level apex predator requiring the largest geographic territorial space

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115. (D) I, II and III
Tree roots open soil macro-pores that facilitate water percolation, whereas deforestation compacts ground surfaces and reduces groundwater infiltration rates. Concurrently, afforestation using water-intensive, fast-growing exotic trees like Eucalyptus can excessively transpire subterranean water reserves, lowering local water tables. Thus, forest management choices directly influence regional hydrological balance and groundwater sustainability.

116. (B) Land area where precipitation collects and drains into a shared water body
A catchment area, or watershed, is a topographically bounded land area where all surface precipitation collects and drains into a common river system, lake, or aquifer. Forested catchments are vital hydrologic units that filter rainfall, regulate stream discharge rates, reduce soil erosion, and replenish groundwater tables across entire river basin landscapes.

117. (C) Porous soil rich in humus and organic matter
Groundwater recharge is maximized in forest soils that are porous, well-structured, and enriched with organic humus. Humus increases soil aggregation and subterranean macro-pore formation, dramatically enhancing water absorption capacity and percolation rates. This enables surface rainwater to easily penetrate deep soil horizons, effectively replenishing subterranean aquifers rather than lost as surface runoff.

118. (D) Forests allow slow, sustained rainwater percolation
Forest ecosystems maintain stable year-round water tables by converting storm precipitation into deep soil percolation. Dense canopies, floor litter, and porous root-channeled soils slow down surface water movement, maximizing infiltration into subterranean aquifers. In contrast, impervious urban concrete surfaces prevent water percolation, forcing heavy surface runoff into drainage channels and lowering local water tables.

119. (A) Hydraulic lift (Hydraulic redistribution)
Hydraulic lift, or hydraulic redistribution, occurs when deep-rooted forest plants absorb water from moist subterranean soil layers at night and release it into drier shallow soil horizons along water potential gradients. This passive process redistributes deep water upwards, making soil moisture available to shallow-rooted plants, soil microbes, and adjacent understory vegetation during dry conditions.

120. (B) Harvesting and processing Non-Timber Forest Products
The forestry sector generates direct rural employment through non-timber forest produce harvesting, silvicultural operations, tree nursery raising, timber extraction, and forest management. Gathering and processing products like tendu leaves, wild honey, gums, and medicinal herbs provide essential seasonal income and employment, particularly for forest-dwelling communities and marginalized rural households across India.

121. (B) State forest departments partnering with communities to manage degraded land
Joint Forest Management is a institutional framework in India established to restore and protect degraded forests through formal partnerships between state forest departments and local village communities. Local institutions, such as Joint Forest Management Committees, receive access to specified non-timber produce and a share of timber harvest revenues in exchange for protecting forests.

122. (B) Bidi rolling industry
The traditional bidi rolling industry relies heavily on collecting tendu leaves from native forests in central and northern India. Seasonal leaf harvesting generates massive rural employment for millions of forest dwellers, particularly tribal women, during pre-monsoon months, serving as a critical source of household income before agricultural activities commence across regional rural sectors.

123. (B) Extracting Sal butter used in food and soap manufacturing
Collecting Sal seeds from Shorea robusta trees provides seasonal rural employment across central and eastern India. Harvested seeds contain high oil content extracted as Sal butter, which is widely utilized in confectionery, chocolate processing as a cocoa butter substitute, pharmaceutical formulations, and soap manufacturing, supporting local tribal livelihoods through forest produce commercialization.

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and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

16. Who is the statutory Chairperson of the National Board for Wildlife (NBWL) in India?
(A) The Minister of Environment, Forest and Climate Change
(B) The Director General of Forests
(C) The Prime Minister of India
(D) The President of India

17. Under the provisions of the Wildlife (Protection) Act, 1972, which authority has the power to declare a wild animal as 'vermin'?
(A) The State Forest Minister
(B) The Central Government by notification
(C) The Chief Wildlife Warden of the State
(D) The National Tiger Conservation Authority

18. Which chapter of the Wildlife (Protection) Act, 1972 specifically deals with the protection of specified plants?
(A) Chapter III
(B) Chapter IIIA
(C) Chapter IV
(D) Chapter IVA

19. According to the Wildlife (Protection) Act, 1972, what is a 'trophy'?
(A) Any whole or partial preserved specimen of a captive or wild animal
(B) An official ceremonial certificate of appreciation awarded to forest personnel for exemplary service
(C) Any captive specimen permanently maintained for public display within a recognized zoological park
(D) A living wild animal specimen that has been formally registered and legally kept as a household pet

20. The Wildlife (Protection) Amendment Act, 2022 reduced the number of schedules in the principal Act from six to how many?
(A) Two
(B) Three
(C) Four
(D) Five

21. What is the fundamental restriction imposed by Section 2 of the Forest (Conservation) Act, 1980?
(A) It prohibits state governments from diverting forest land for non-forest purposes without Central Government approval
(B) It strictly bans the artificial planting or cultivation of all non-native exotic tree species within designated reserve forest boundaries
(C) It permanently bans all traditional forms of indigenous tribal access to non-timber forest produce across all territorial state forests
(D) It restricts state authorities from establishing new national parks or wildlife sanctuaries without obtaining explicit prior Supreme Court permission

22. Consider the following statements regarding the Forest (Conservation) Act, 1980:
I. It extends to the whole of India.
II. The term 'non-forest purpose' includes the cultivation of tea, coffee, and rubber on forest land.
III. Clearing forest land for reforestation activities is considered a 'non-forest purpose' under the Act.
Which of the above statements is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II and III

23. What is the role of the Forest Advisory Committee (FAC) constituted under the Forest (Conservation) Act, 1980?
(A) To determine and fix the standardized minimum market price for commercial timber harvested from government forests
(B) To advise the Central Government regarding approvals for forest land diversion
(C) To conduct annual recruitment examinations and allocate Indian Forest Service (IFS) officers to state cadres
(D) To directly supervise and manage the daily administrative and financial affairs of all national parks

24. In the context of the diversion of forest land, what does 'Net Present Value' (NPV) denote?
(A) The total net economic value realized from auctioning all timber species cleared for project construction
(B) The preliminary financial budget allocated by state environmental authorities to establish a regional botanical zoo
(C) A charge compensating for the loss of

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strategy utilized by geneticists to establish purebred animal lines
(D) A sharp reduction in population size leading to a loss of genetic variation

99. The 'founder effect' is a genetic phenomenon that occurs when:
(A) A new population is founded by very few individuals, causing reduced genetic diversity
(B) A widespread species successfully expands its geographic distribution globally without undergoing any loss of genetic variation
(C) An aggressive exotic invasive species rapidly colonizes a habitat and completely replaces a native species in the local ecosystem
(D) Older dominant male individuals in a social herd exclusively control and dominate the seasonal breeding process

100. Which of the following is considered a 'non-invasive' genetic sampling method used in wildlife conservation?
(A) Physically capturing a wild tiger in a trap net to draw venous blood samples
(B) Chemically tranquilizing a wild elephant using dart guns to remove a muscle tissue biopsy
(C) Collecting naturally shed hair or feces to extract DNA
(D) Surgically removing a small biopsy piece from a wild bird's wing or ear tissue

101. What does the term 'Minimum Viable Population' (MVP) indicate in conservation biology?
(A) The smallest population size likely to survive long-term despite random uncertainties
(B) The absolute maximum number of individual organisms a habitat can sustain before severe starvation occurs
(C) The precise and verified count of individual animals of a species currently maintained within a zoological park
(D) The legal minimum limit defining the absolute lowest number of animals permitted to be harvested during hunting season

102. Consider the following statements regarding the applications of conservation genetics:
I. It helps identify distinct evolutionary lineages and cryptic species that look identical physically.
II. It is used in forensic wildlife investigations to link confiscated meat to a specific protected species.
III. It can determine the extent of gene flow between fragmented populations in different national parks.
Which of the above statements is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II and III

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103. The traditional 'pugmark' census technique, once widely used across India, primarily relies on measuring and analyzing the footprints of which animal?
(A) Elephant
(B) Tiger
(C) Rhinoceros
(D) Blackbuck

104. Modern camera trapping methods can accurately identify individual animals of certain species (like tigers and leopards) based on which scientific principle?
(A) Subtle localized differences in surface body temperature recorded by sensitive thermal infrared sensors
(B) The precise recurring time of day or night when an individual animal regularly visits a monitored forest waterhole
(C) Unique natural markings like coat stripe or rosette patterns
(D) Microscopic variations in eye tapetum coloration reflected back in the automatic camera strobe flash

105. The 'Line Transect' method in a wildlife census is most commonly and effectively used to estimate the density of which type of animal populations?
(A) Pelagic deep-water marine mammal species
(B) Microscopic invertebrates and soil organisms
(C) Small nocturnal burrowing rodent populations
(D) Terrestrial large herbivores and ungulates

106. In the context of wildlife monitoring in India, what is 'M-STrIPES'?
(A) A software system for tiger patrol logging and ecological monitoring
(B) A newly identified species of striped hyena recently documented in central Indian forests
(C) A specialized long-range pneumatic gun designed to tranquilize large wild predators safely
(D) A highly durable and reflective safety collar attached to wildlife to prevent road accidents

(C) Its overall global population remains stable even though its native habitat is completely destroyed
(D) It is formally confirmed as an extinct species for which no physical fossil records exist

34. In the context of IUCN classifications, a taxon is considered 'Endangered' when it is not Critically Endangered but is facing what level of risk?
(A) An immediate and extremely high probability of total extinction in natural habitats
(B) A relatively moderate risk of facing biological extinction over the long-term future
(C) No severe immediate threat to survival but heavily reliant on active species management programmes
(D) A very high risk of extinction in the wild

35. For which of its body parts is the Indian Pangolin primarily poached and illegally trafficked globally?
(A) Its scales for traditional medicine, and its meat
(B) Its large curved claws, which are carved into luxury traditional ornaments
(C) Its thick scaly tail, heavily processed to manufacture commercial leather belts
(D) Its specialized internal organs, widely traded as potent natural aphrodisiacs

36. What is the primary biological composition of a rhinoceros horn, which makes its illegal trade scientifically unfounded for medicinal benefits?
(A) Ivory (dentine)
(B) Solidified calcium carbonate
(C) Keratin
(D) Cartilage and bone marrow

37. Which endangered animal is heavily poached in parts of Asia for the extraction of bile, believed to have medicinal properties?
(A) Asiatic Black Bear
(B) Greater Asian Elephant
(C) High-altitude Snow Leopard
(D) Greater One-horned Rhinoceros

38. Consider the following stages of the illegal wildlife trade supply chain:
I. Smuggling and transit across international or state borders
II. Poaching and extraction from natural habitat
III. Retail sale to the end consumer
IV. Consolidation and storage by local middlemen
Which of the following represents the correct sequential order from origin to destination?
(A) II, I, IV, III
(B) II, IV, I, III
(C) IV, II, I, III
(D) II, IV, III, I

39. The illegal trade of 'Shahtoosh' shawls is directly responsible for the critical decline of which wild animal?
(A) High-altitude Snow Leopard
(B) Tibetan Antelope
(C) Endangered Himalayan Musk Deer
(D) Himalayan Wild Tahr

40. Which of the following is a key legal mechanism under the Wildlife (Protection) Act, 1972 to deter wildlife crime?
(A) Imposing nominal civil financial penalties without imprisonment sentence for all first-time offender categories
(B) Allowing convicted offenders the legal option to buy back confiscated illegal wildlife products from government storage
(C) Confiscation of vehicles, weapons, and tools used in offences
(D) Issuing formal mandatory written warnings to suspected individuals prior to registering an official penal charge sheet

41. What is the full form of WCCB, the statutory multi-disciplinary body established by the Government of India to combat organised wildlife crime?
(A) Wildlife Conservation and Control Bureau
(B) Wildlife Care and Conservation Board
(C) Wildlife Crime Check Bureau
(D) Wildlife Crime Control Bureau

42. Under which ministry does the Wildlife Crime Control Bureau (WCCB) function?
(A) Ministry of Environment, Forest and Climate Change
(B) Ministry of Home Affairs, Government of India
(C) Ministry of Earth Sciences and Environmental Safety
(D) Ministry of Science, Technology and Space Research

43. Operation 'Save Kurma', conducted by the WCCB, specifically aimed to curb the illegal trade of which species?

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tangible and intangible forest ecosystem services
(D) The cumulative annual budget expended on salaries and allowances for forest department personnel patrolling the project area

25. Which landmark Supreme Court judgment expanded the definition of 'forest' under the Forest (Conservation) Act, 1980 to include any land that fits the dictionary meaning of a forest, regardless of ownership?
(A) M.C. Mehta v. Kamal Nath (1997)
(B) Indian Council for Enviro-Legal Action v. Union of India (1996)
(C) Animal Welfare Board of India v. A. Nagaraja (2014)
(D) T.N. Godavarman Thirumulpad v. Union of India (1996)

26. Under the Forest (Conservation) Rules, who acts as the nodal officer for processing forest clearance proposals in a State?
(A) An officer designated by the State, typically a Conservator of Forests
(B) The executive District Magistrate acting in consultation with local revenue officers
(C) The Chief Minister of the State acting through the cabinet secretariat
(D) The local Member of Parliament representing the affected electoral constituency

27. Compensatory afforestation under the Forest (Conservation) Act is typically required to be done on which type of land?
(A) Highly fertile prime agricultural land situated within the administrative boundaries of the same district
(B) Degraded forest land twice the diverted area, or equivalent non-forest land
(C) Formally designated urban municipal park areas located within city boundary limits
(D) Undivided private real estate holdings owned directly by the commercial project proponents

28. According to the IUCN Red List, which criteria classifies a species as 'Critically Endangered'?
(A) A population decline of 10% over the last 10 years
(B) An extremely high risk of extinction in the wild in the immediate future
(C) The species is no longer found in its original habitat but survives in zoos
(D) A continuous but slow decline in habitat quality

29. Where is the global headquarters of the International Union for Conservation of Nature (IUCN) located?
(A) Gland, Switzerland
(B) Geneva, Switzerland
(C) Nairobi, Kenya
(D) New York, USA

30. Consider the following IUCN Red List categories:
I. Vulnerable (VU)
II. Near Threatened (NT)
III. Endangered (EN)
IV. Critically Endangered (CR)
Which of the above categories are collectively referred to as 'Threatened' species by the IUCN?
(A) I, II, and III only
(B) II, III, and IV only
(C) I, III, and IV only
(D) I, II, III, and IV

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31. What does the IUCN category 'Extinct in the Wild' (EW) indicate?
(A) The species has completely vanished from all global habitats and no living individual organisms remain anywhere on Earth
(B) The species can no longer be found within its natural forest habitats but maintains thriving populations in urban areas
(C) Available ecological data regarding the species is entirely insufficient to assess or determine its current survival status
(D) The taxon survives only in captivity, cultivation, or outside its historic range

32. Which organisation publishes the internationally recognised 'Red Data Book' detailing the conservation status of species?
(A) World Wildlife Fund (WWF)
(B) United Nations Environment Programme (UNEP)
(C) International Union for Conservation of Nature (IUCN)
(D) Convention on Biological Diversity (CBD) secretariat

33. If a species is categorised as 'Data Deficient' (DD) by the IUCN, what does it signify?
(A) Its population is expanding rapidly and it is categorized as completely safe from extinction
(B) Inadequate information exists to evaluate its extinction risk

54. What is the fundamental legal difference between a National Park and a Wildlife Sanctuary under the Wildlife (Protection) Act, 1972?
(A) A National Park exclusively protects avian species, whereas a Wildlife Sanctuary exclusively protects terrestrial mammals
(B) Sanctuaries are managed and owned by private entities, whereas National Parks are strictly state-owned public properties
(C) Sanctuaries can be legally downgraded to municipal Zoos, whereas National Parks are constitutionally exempt from downgrading
(D) Grazing may be allowed in a Sanctuary, but is prohibited in a National Park

55. Which is the largest Wildlife Sanctuary in Uttar Pradesh by area?
(A) National Chambal Sanctuary
(B) Hastinapur Wildlife Sanctuary
(C) Kaimoor Wildlife Sanctuary
(D) Sohagi Barwa Wildlife Sanctuary

56. Ranipur Tiger Reserve, the fourth tiger reserve of Uttar Pradesh, is located in which region?
(A) Northern Terai region
(B) Eastern Purvanchal region
(C) Bundelkhand region
(D) Western Braj region

57. Which of the following best defines 'in-situ' conservation?
(A) The systematic conservation and cataloging of valuable plant genetic resources within a controlled laboratory setting
(B) The intentional shifting of critically endangered animal species to regional zoological parks for artificial breeding
(C) The long-term preservation of crop and plant seeds under specialized sub-zero temperatures in secure gene banks
(D) Conserving ecosystems and viable species populations in their natural habitats

58. Which of the following is an example of in-situ conservation?
(A) Biosphere Reserve
(B) Botanical Garden
(C) Zoological Park
(D) Wildlife Safari Park

59. What are 'Sacred Groves' in the context of conservation?
(A) Large government-owned commercial timber plantations systematically cultivated for industrial wood extraction
(B) Forest patches protected by local communities based on cultural or religious beliefs
(C) Dedicated floral exhibition areas located within a public zoo for propagating endangered plant species
(D) Public forest lands specifically cleared by government permits for constructing religious shrines and temples

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60. Consider the following statements regarding the advantages of in-situ conservation:
I. It allows animals to evolve alongside their natural environment.
II. It is generally more expensive and labour-intensive per species compared to maintaining a captive zoo population.
III. It protects not just a single species but the entire ecosystem, including unknown microscopic organisms.
Which of the above statements is/are correct?
(A) I and II only
(B) I and III only
(C) II and III only
(D) I, II and III

61. What is the primary purpose of designating Marine Protected Areas (MPAs)?
(A) To protect marine ecosystems, biodiversity, and habitats like coral reefs
(B) To systematically facilitate and regulate large-scale commercial fishing operations across territorial waters
(C) To establish and maintain safe commercial shipping lanes for unhindered international maritime trade
(D) To incentivize and promote deep-sea seabed mineral extraction in a strictly controlled administrative manner

62. Why are 'Wildlife Corridors' essential for in-situ conservation?
(A) They provide specialized paved access paths for safari tourist vehicles inside core zones of national parks
(B) They serve as designated sustainable forest buffer areas where local indigenous communities can hunt legally
(C) They link fragmented habitats, enabling genetic exchange and wildlife migration
(D) They are large artificial fence enclosures constructed to temporarily trap migrating wild animals for scientific tagging

81. India's National Biodiversity Action Plan (NBAP) was developed primarily to fulfil obligations under which international agreement?
(A) United Nations Framework Convention on Climate Change (UNFCCC)
(B) Convention on Biological Diversity (CBD)
(C) Convention on International Trade in Endangered Species (CITES)
(D) Ramsar Convention on Wetlands

82. Where is the headquarters of the National Biodiversity Authority (NBA), established under the Biological Diversity Act, 2002?
(A) New Delhi
(B) Dehradun
(C) Bhopal
(D) Chennai

83. Under the Biological Diversity Act, 2002, what is the primary function of a Biodiversity Management Committee (BMC) set up at the local body level?
(A) To prepare and maintain the People's Biodiversity Register
(B) To evaluate and issue official international patents for newly developed agricultural plant varieties
(C) To directly arrest and prosecute individuals caught engaging in illegal wildlife poaching activities
(D) To regularly auction public local forest land to private companies for commercial timber extraction

84. What does the 'People's Biodiversity Register' (PBR) comprehensively document?
(A) The detailed daily financial transactions and budgetary allocations of the local forest department office
(B) A verified official list of all village residents who are legally licensed and permitted to own firearms
(C) Information on local biological resources and traditional knowledge
(D) The demographic census data and household statistics of human populations living adjacent to national parks

85. Match List I with List II:
List I: (Biological Diversity Framework Term)
P. National Level
Q. State Level
R. Local Level
S. Benefit Mechanism

List II: (Corresponding Entity/Concept)
1. Biodiversity Management Committee (BMC)
2. Access and Benefit Sharing (ABS)
3. National Biodiversity Authority (NBA)
4. State Biodiversity Board (SBB)

(A) P-3, Q-4, R-1, S-2
(B) P-4, Q-3, R-2, S-1
(C) P-3, Q-1, R-4, S-2
(D) P-1, Q-2, R-3, S-4

86. In the context of biodiversity conservation, what does 'Access and Benefit Sharing' (ABS) ensure?
(A) Guaranteeing completely free and unrestricted entrance access to all national parks for local resident tourists
(B) Ensuring equal and standardized distribution of harvested timber products among all local village households
(C) Promoting the transparent public sharing of official wildlife census data with international conservation media
(D) Equitable sharing of benefits from using biological resources and traditional knowledge

87. Which globally recognised endangered animal serves as the logo of the World Wide Fund for Nature (WWF)?
(A) Royal Bengal Tiger
(B) Giant Panda
(C) Polar Bear
(D) Blue Whale

88. Founded in 1883, which of the following is one of the oldest non-governmental organisations in India engaged in conservation and nature research?
(A) Wildlife Trust of India (WTI)
(B) Wildlife Protection Society of India (WPSI)
(C) Bombay Natural History Society (BNHS)
(D) Centre for Science and Environment (CSE)

89. The Wildlife Trust of India (WTI), a prominent NGO, is well known for operating which of the following specialized conservation units in collaboration with state governments?
(A) Large-scale commercially operated public zoos and animal theme parks
(B) Municipal solid waste recycling and processing plants in urban areas
(C) Advanced biotechnology laboratories for researching genetically modified crops
(D) Mobile Veterinary Service units and wildlife

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72. Which endangered crocodilian species, native to the Indian subcontinent, was brought back from the brink of extinction through a successful captive breeding and reintroduction project initiated in 1975?
(A) Saltwater Crocodile
(B) Mugger Crocodile
(C) Gharial
(D) Nile Crocodile

73. What is 'inbreeding depression', a major challenge in managing captive breeding populations?
(A) A severe chronic psychological condition observed in captive animals caused by confinement in small cage sizes
(B) The gradual loss of appetite and digestive dysfunction in captive animals fed an artificial, unnatural diet
(C) The complete failure of captive-bred animals to identify and evade natural predators upon release into wild habitats
(D) Reduced biological fitness and survival from mating closely related individuals

74. In zoo management, what is a 'Studbook'?
(A) A registry tracking pedigree and demography to manage genetic diversity
(B) An administrative logbook used by keepers for recording the exact daily nutritional food intake of carnivores
(C) An illustrated promotional guidebook distributed to visiting tourists detailing animal enclosure locations
(D) A standardized accounting ledger maintained by zoo directors to track operating and capital expenditures

75. The concept of Joint Forest Management (JFM) in India, involving local communities in the protection of degraded forests, originated from a successful experiment in the 1970s at which location?
(A) Sukhomajri, Haryana
(B) Arabari, West Bengal
(C) Ralegan Siddhi, Maharashtra
(D) Bishnoi villages, Rajasthan

76. In Uttarakhand, which traditional community-based institution plays a vital role in managing and protecting local forest resources?
(A) Zila Parishad Forests
(B) Van Panchayats
(C) Sacred Consortia
(D) Eco-Clubs

77. Eco-development Committees (EDCs) are typically formed in and around which specific areas to reduce community dependency on forest resources?
(A) Protected Areas (National Parks and Sanctuaries)
(B) Designated commercial and manufacturing industrial estates
(C) Formally recognized urban municipal corporation limits
(D) Regulated coastal and marine commercial fishing zones

78. Which of the following represents the correct chronological sequence of the evolution of forest policy in post-independence India leading toward community participation?
(A) Forest (Conservation) Act - National Forest Policy emphasising JFM - Forest Rights Act
(B) Forest Rights Act - Forest (Conservation) Act - National Forest Policy emphasising JFM
(C) National Forest Policy emphasising JFM - Forest (Conservation) Act - Forest Rights Act
(D) Forest (Conservation) Act - Forest Rights Act - National Forest Policy emphasising JFM

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79. The Amrita Devi Bishnoi National Award is instituted by the Government of India for exceptional courage in which field?
(A) Marine biology research
(B) Industrial pollution control
(C) Afforestation in urban cities
(D) Wildlife conservation

80. The historic Chipko Movement, a landmark in community-led forest conservation in India, primarily used which non-violent method to stop deforestation?
(A) Organising nationwide consumer boycotts against the commercial purchase of all wooden products
(B) Conducting public hunger strikes and fasting unto death outside regional forest department offices
(C) Hugging trees to physically prevent loggers from felling them
(D) Purchasing endangered forest lands collectively through monetary contributions by village residents

(A) Captive live wild elephants
(B) Turtles and tortoises
(C) Royal Bengal Tiger skins and bones
(D) Endangered Indian pangolin species

44. The WCCB launched 'Operation Clean Art' across India to crack down on the illegal trade of paintbrushes made from the hair of which animal?
(A) Red Panda
(B) Mongoose
(C) Squirrel
(D) Civet cat

45. Match List I with List II**:**
List I: (Anti-trafficking Operation)
P. Operation Softgold
Q. Operation Wildnet
R. Operation Birbidi
S. Operation Thunderbird
List II: (Targeted Species/Product)
1. Internet-based illegal wildlife trade
2. Shahtoosh shawls
3. Multi-species enforcement operation across India
4. Illegal trade of wild birds
(A) P-2, Q-1, R-4, S-3
(B) P-1, Q-2, R-3, S-4
(C) P-4, Q-3, R-1, S-2
(D) P-2, Q-4, R-1, S-3

46. TRAFFIC, an international non-governmental organisation, is primarily dedicated to which of the following activities?
(A) Directing capital grants toward the physical construction and expansion of modern public zoos
(B) Providing specialized veterinary healthcare and sterilization services to stray dogs across urban centers
(C) Monitoring trade in wild plants and animals to ensure sustainability
(D) Actively promoting the expansion of unregulated international trade networks in exotic timber species

47. How many notified National Parks are currently present in the state of Uttar Pradesh?
(A) One
(B) Three
(C) Five
(D) Seven

48. In which district of Uttar Pradesh is the Dudhwa National Park located?
(A) Pilibhit district
(B) Bahraich district
(C) Lakhimpur Kheri
(D) Sonbhadra district

49. In the zonation of a Biosphere Reserve, which zone is kept absolutely undisturbed and legally protected where no human activity (except research) is typically permitted?
(A) Buffer Zone
(B) Core Zone
(C) Transition Zone
(D) Manipulation Zone

50. Given below are two statements, one labelled as Assertion (A) and the other as Reason (R).
Assertion (A): Human settlements and grazing of livestock are strictly prohibited within a National Park in India.
Reason (R): National Parks are designated to conserve natural ecosystems with minimal human interference, ensuring absolute protection of flora and fauna.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

51. The Suhelwa Wildlife Sanctuary is spread across which of the following districts of Uttar Pradesh?
(A) Shravasti, Balrampur, Gonda
(B) Agra, Etawah, and Mainpuri
(C) Mirzapur, Sonbhadra, and Chandauli
(D) Lalitpur, Jhansi, and Jalaun

52. The Okhla Bird Sanctuary is located on the border of Delhi and which district of Uttar Pradesh?
(A) Ghaziabad District
(B) Meerut District
(C) Gautam Buddha Nagar
(D) Bulandshahr District

53. Which was the first Wildlife Sanctuary established in Uttar Pradesh (in 1957)?
(A) Chandraprabha Wildlife Sanctuary
(B) Kaimoor State Wildlife Sanctuary
(C) Ranipur Protected Wildlife Sanctuary
(D) Katarniaghat Forest Wildlife Sanctuary

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rescue centres

90. Aaranyak, a leading scientific research and conservation NGO, primarily focuses its wildlife conservation efforts in which region of India?
(A) Northeast India (Assam)
(B) Western Ghats
(C) Thar Desert
(D) Andaman and Nicobar Islands

91. What role do NGOs like the Wildlife Protection Society of India (WPSI) primarily play in wildlife law enforcement?
(A) They hold statutory judicial authority allowing field personnel to arrest suspected wildlife poachers directly
(B) They gather wildlife trade intelligence to assist enforcement agencies
(C) They independently execute covert paramilitary operations to neutralize illegal international wildlife smugglers
(D) They serve as the administrative body responsible for issuing game hunting licenses to private individuals

92. Which international NGO publishes the 'Living Planet Report', a comprehensive study of trends in global biodiversity and the health of the planet?
(A) Greenpeace International
(B) World Wide Fund for Nature (WWF)
(C) BirdLife International Secretariat
(D) Conservation International Foundation

93. What is the fundamental objective of a wildlife rehabilitation centre?
(A) To treat and shelter sick or injured wildlife for reintroduction into the wild
(B) To house wild animal specimens permanently within specialized enclosures for public recreation and exhibition
(C) To capture and systematically train wild animals for commercial entertainment performances in traveling circuses
(D) To selectively breed aggressive carnivore species specifically for stocking private recreational hunting reserves

94. In the context of releasing rehabilitated wildlife, what does a 'soft release' involve?
(A) Releasing the animal instantly from a transport cage directly into a completely unstudied and unfamiliar forest
(B) Transporting and immediately releasing the animal into a public urban city park environment
(C) Allowing the animal to acclimatize in a temporary enclosure before full release
(D) Peacefully euthanizing the animal under veterinary supervision when injuries are deemed severe and unrecoverable

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95. Given below are two statements, one labelled as Assertion (A) and the other as Reason (R).
Assertion (A): Hand-rearing of orphaned wild mammals in rehabilitation centres must be done with minimal human contact and without treating them as pets.
Reason (R): Human imprinting alters the natural behaviour of wild animals, severely reducing their chances of survival when released back into the wild.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

96. Under the Wildlife (Protection) Act, 1972, which statutory body issues the technical guidelines for the establishment and management of Wildlife Rescue Centres in India?
(A) Animal Welfare Board of India
(B) Wildlife Crime Control Bureau
(C) Central Zoo Authority (CZA)
(D) National Tiger Conservation Authority

97. Which technology is most commonly used by researchers for post-release monitoring of rehabilitated large carnivores like tigers or leopards?
(A) Leg banding
(B) Radio or GPS telemetry collars
(C) Microchip implants solely for reading at close range
(D) Spray painting bright colours on the animal's coat

98. In conservation genetics, what is meant by a 'genetic bottleneck'?
(A) An abnormal situation where an animal's genetic sequence mutates at extreme rates owing to exposure to high radiation
(B) The presence of a major physical geographic barrier that permanently prevents two animal populations from physically meeting
(C) A controlled and deliberate captive breeding

63. Which of the following best describes 'ex-situ' conservation?
(A) Protecting a wild tiger population within its natural habitat in a designated Tiger Reserve
(B) Establishing legally recognized community reserves across traditional indigenous tribal belts
(C) Implementing strict anti-poaching patrols and ranger stations inside natural wild forests
(D) Conserving biodiversity components outside their natural habitats

64. In ex-situ conservation, cryopreservation of seeds and tissues is typically carried out using which substance to maintain extremely low temperatures?
(A) Liquid oxygen
(B) Solid carbon dioxide
(C) Liquid nitrogen
(D) Concentrated ammonia

65. What is the main objective of establishing a 'Seed Bank'?
(A) To systematically store high-yielding commercial crop seeds intended exclusively for market distribution and sale
(B) To preserve plant genetic diversity as an insurance against extinction
(C) To systematically replace natural primary forests with high-yielding genetically modified agricultural plant varieties
(D) To distribute certified free seeds to rural farming households for annual seasonal agricultural cultivation

66. The Central Zoo Authority (CZA), the statutory body regulating the functioning of zoos in India, was established in which year?
(A) 1972
(B) 1980
(C) 1992
(D) 2002

67. The Acharya Jagadish Chandra Bose Indian Botanic Garden, famous for the Great Banyan Tree and ex-situ plant conservation, is located in which state?
(A) West Bengal
(B) Maharashtra
(C) Kerala
(D) Uttar Pradesh

68. Which of the following is considered a primary conservation role of a modern zoological park?
(A) Generating maximum financial revenue through organizing animal entertainment shows for visitors
(B) Acting as an authorized commercial trading market for the public purchase and sale of exotic pets
(C) Captive breeding of endangered species and conservation education
(D) Extracting and harvesting wild animal biological products for commercial traditional medicinal use

69. What is the primary ecological goal of a captive breeding program for an endangered species?
(A) To multiply populations in captivity for reintroduction into the wild
(B) To permanently domesticate wild animal species for agricultural labor and direct human utility
(C) To create visually striking hybrid species specifically designed for public exhibition in zoo displays
(D) To continuously supply wild animal specimens for scientific research and medical laboratory testing

70. Consider the following steps involved in a captive breeding and release program:
I. Post-release monitoring and habitat protection
II. Selection of genetically diverse founder animals
III. Soft release or acclimatization in semi-wild enclosures
IV. Breeding under controlled conditions
Which of the following represents the correct logical sequence of these steps?
(A) II, IV, III, I
(B) IV, II, III, I
(C) II, III, IV, I
(D) III, II, IV, I

71. Vulture Conservation Breeding Centres (VCBC) in India, such as the one in Pinjore, were established primarily to save vultures from mass mortality caused by which veterinary drug?
(A) Paracetamol
(B) Diclofenac
(C) Ivermectin
(D) Amoxicillin

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107. The 'Pellet Count' method is an indirect sign survey technique frequently used by forest officials to estimate the relative abundance of:
(A) Raptors and birds of prey
(B) Deer and ungulates
(C) Crocodiles, alligators, and caimans
(D) Native freshwater fish species

108. For assessing the population of certain bird species, such as the Indian Peafowl or pheasants, researchers often rely on which specialized census technique during the breeding season?
(A) Acoustic call count method
(B) Footprint and pugmark tracing
(C) Fecal scat laboratory analysis
(D) Non-lethal bait trapping surveys

109. The 'Mark-Recapture' method used in wildlife population estimation requires capturing animals, marking them, releasing them, and then resampling the population. The population estimate is based on the ratio of:
(A) Marked to total animals in the second catch
(B) Male to female individuals present in the second catch
(C) Adult to juvenile individuals observed during the first catch
(D) Dead to living individual animals located within a given survey area

110. Consider the following statements regarding the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES):
I. Appendix I includes species threatened with extinction, and commercial trade in these is generally prohibited.
II. Appendix II includes species not necessarily threatened with extinction, but whose trade must be controlled.
III. Appendix III contains species that are protected in at least one country, which has asked other CITES Parties for assistance in controlling the trade.
IV. CITES is a legally binding international agreement but does not take the place of national laws.
Which of the above statements are correct?
(A) I, II and III only
(B) I, II and IV only
(C) II, III and IV only
(D) I, II, III and IV

111. CITES (Convention on International Trade in Endangered Species) entered into force internationally in which year?
(A) 1960
(B) 1975
(C) 1992
(D) 2002

112. How does CITES ensure that trade in Appendix II species is sustainable?
(A) By imposing a complete and permanent legal ban on all commercial movement of these species across international borders
(B) By issuing export permits only when trade will not jeopardize species survival
(C) By levying a compulsory uniform international tax on all commercial wildlife exports to fund conservation projects
(D) By strictly restricting all species movement to non-commercial exchange between formally accredited zoological parks

113. The Convention on Biological Diversity (CBD) was opened for signature at which historic global event in 1992?
(A) The Earth Summit (UNCED) in Rio de Janeiro
(B) The Stockholm Conference on the Human Environment
(C) The World Summit on Sustainable Development in Johannesburg
(D) The Paris Climate Conference

114. The Cartagena Protocol, a supplementary agreement to the CBD, primarily deals with which specific issue?
(A) Prevention and law enforcement mechanisms against illegal international trade in elephant ivory and ivory products
(B) International agreement for the habitat protection of transboundary migratory bird flyways across continents
(C) Safe handling, transport, and use of living modified organisms from biotechnology
(D) Comprehensive frameworks for the global reduction of greenhouse gas emissions resulting from tropical deforestation

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115. Which protocol under the Convention on Biological Diversity explicitly addresses 'Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization'?
(A) Kyoto Protocol

(B) Montreal Protocol
(C) Geneva Protocol
(D) Nagoya Protocol

116. The globally agreed 'Aichi Biodiversity Targets' were adopted for which specific decade under the framework of the CBD?
(A) 1990 - 2000
(B) 2000 - 2010
(C) 2011 - 2020
(D) 2021 - 2030

117. What is the supreme decision-making body of the Convention on Biological Diversity called?
(A) The Global Environment Facility Council
(B) The Conference of the Parties (COP)
(C) The World Conservation Congress Assembly
(D) The United Nations Security Council

118. India's current (third) National Wildlife Action Plan (NWAP) covers which of the following periods?
(A) 2002 - 2016
(B) 2010 - 2025
(C) 2017 - 2031
(D) 2020 - 2035

119. A major shift in conservation strategy emphasized in the third National Wildlife Action Plan (2017-2031) is the adoption of which approach?
(A) A landscape approach integrating conservation across ecosystems beyond Protected Areas
(B) A rigid "fortress conservation" strategy that restricts management efforts strictly to designated Core Zones
(C) A full-scale economic commercialization of forest wildlife resources to generate self-sustaining conservation funding
(D) The complete structural disbanding and decentralization of all statutory state-level wildlife advisory boards

120. Match List I with List II**:**
List I: (NWAP Priority Theme)
P. Climate Change integration
Q. Control of poaching
R. Human-Wildlife Conflict
S. Eco-tourism
List II: (Key Objective)
1. Ensuring tourism benefits local communities without disturbing wildlife
2. Mitigating crop damage and human casualties by wildlife
3. Strengthening intelligence gathering and WCCB
4. Adapting management plans to shifting vegetation and habitats
(A) P-4, Q-3, R-2, S-1
(B) P-3, Q-4, R-1, S-2
(C) P-4, Q-2, R-3, S-1
(D) P-1, Q-3, R-2, S-4

121. The third National Wildlife Action Plan is uniquely noted for being the first NWAP to recognise and integrate the concerns related to the impact of which global phenomenon on wildlife?
(A) Climate Change
(B) Space exploration
(C) Introduction of plastic currency
(D) Urban metro rail projects exclusively

122. Under the NWAP guidelines for Human-Wildlife Conflict mitigation, which of the following is recommended as a preferred long-term solution?
(A) Systematically culling all wild predator populations found roaming outside protected national park boundaries
(B) Forcibly relocating all human population settlements residing along forest fringes to urban commercial centers
(C) Permanently discontinuing government financial compensation schemes for agricultural crop damage caused by wildlife
(D) Securing and restoring traditional wildlife corridors

123. In recent years, Unmanned Aerial Vehicles (UAVs) or drones have been increasingly deployed by the forest department primarily for what purpose?
(A) Delivering official postal mail and administrative supplies to isolated interior forest tribal settlements
(B) Aerial surveillance, anti-poaching patrols, and tracking wildfires
(C) Uniformly spraying synthetic chemical fertilizers over natural wild grassland ecosystems to boost forage growth
(D) Safely transporting eco-tourists across steep forested river valleys and inaccessible mountain terrains

124. How is Artificial Intelligence (AI) currently being utilised to process camera trap data in large-scale wildlife censuses?
(A) By generating synthetic digital images of

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extinct animal species for departmental public relations campaigns
(B) By remotely adjusting and controlling localized micro-weather conditions surrounding physical camera traps
(C) By rapidly processing images to identify species and individual animals
(D) By attempting to physically modify or sequence the genetic structure of photographed wild animal specimens

125. Geographic Information Systems (GIS) play a critical role in wildlife conservation by enabling managers to:
(A) Artificially synthesize complex wild animal DNA sequences within a specialized research laboratory
(B) Predict the precise timing and epicenter of impending earthquakes inside protected forest areas
(C) Accurately measure and record the daily nutritional caloric intake of captive zoological animals
(D) Map forest cover, overlay habitat data, and model wildlife corridors

126. e-Surveillance systems, utilizing thermal imaging cameras on high towers in places like Kaziranga and Dudhwa, are highly effective because they can:
(A) Detect heat signatures of poachers and animals in darkness or fog
(B) Accurately measure the precise biological age and wood density of standing trees from a distance
(C) Continuously record low-frequency underwater sound waves and bio-acoustic signals in deep river channels
(D) Automatically target and neutralize armed poachers using automated high-energy laser beams

127. Radio Frequency Identification (RFID) microchips are often used in wildlife management for which purpose?
(A) To continuously track the transcontinental migration routes of pelagic birds across oceans via satellite signals
(B) To individually identify rescued or legally owned captive wildlife
(C) To record and measure ambient rainfall data and weather variables inside a wildlife sanctuary automatically
(D) To emit ultrasonic acoustic signals that scare away wild herbivores from fringe agricultural fields

128. Acoustic monitoring devices strategically placed in a dense forest canopy are programmed to alert forest guards immediately upon detecting the sound of:
(A) Severe natural acoustic disturbances like thunderstorms and heavy rainfall
(B) Gunshots or chainsaws from illegal logging
(C) The rising sound of fast-flowing rivers flooding their natural embankments
(D) Mating calls produced by small forest insects

129. The legal category of 'Community Reserve' was introduced into the Wildlife (Protection) Act, 1972 through an amendment in which year?
(A) 1986
(B) 1991
(C) 2002
(D) 2010

130. Given below are two statements, one labelled as Assertion (A) and the other as Reason (R).
Assertion (A): Community Reserves are typically declared on private or community-owned lands, not on reserved forests.
Reason (R): The purpose of a Community Reserve is to recognise and legally back the conservation efforts of individuals or communities on their own lands.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

131. Who heads the Community Reserve Management Committee that is formed to maintain and manage a designated Community Reserve?
(A) The serving Chief Minister of the concerned State Government
(B) The Inspector General of Forests nominated by the Central Ministry in Delhi
(C) A sitting or retired judge of the concerned State High Court
(D) A nominee of the local community or Village Panchayat

132. The provisions relating to the declaration of Community Reserves do NOT apply to lands situated in:
(A) Areas designated under the Scheduled Tribes

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adaptations and lack natural occurrence elsewhere, their localized populations remain exceptionally susceptible to habitat destruction, climate changes, and localized ecological threats.

9. (D) To protect a species with large habitat requirements, indirectly sheltering co-occurring species
An umbrella species typically possesses extensive home-range requirements and complex habitat demands across a broad landscape. Conserving sufficient habitat to meet the ecological demands of an umbrella species automatically establishes protective coverage for numerous co-occurring flora and fauna sharing the same ecosystem, making this concept a practical and efficient strategy in conservation planning.

10. (A) P-3, Q-4, R-1, S-2
Genetic diversity involves gene variations within species populations. Species diversity measures species richness and relative abundance in a given territory. Ecosystem diversity encompasses the structural variety of habitats, biological communities, and ecological processes across biomes. An ecotone represents a narrow transitional zone where two distinct biological communities meet, featuring high species richness and unique interactions.

11. (B) It reduces ecosystem resilience, threatening food security and natural medicine supply
Biodiversity degradation undermines essential ecosystem services that support human life, including crop pollination, natural pest control, soil fertility, and hydrological regulation. The loss of wild species weakens ecosystem resilience against environmental stresses, reduces access to wild genetic resources critical for disease-resistant crops, and depletes natural bioactive compounds essential for medical drug development.

12. (B) Habitat destruction and fragmentation
Human activities such as agricultural expansion, deforestation, urbanization, and linear infrastructure development drive widespread habitat destruction and fragmentation worldwide. Dividing large continuous biomes into isolated habitat patches reduces living space, restricts gene flow, exacerbates edge effects, limits resource availability, and disrupts natural wildlife migration corridors, posing the leading threat to global species survival.

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13. (B) 1972
The Wildlife Protection Act was enacted by the Indian Parliament in 1972 to provide a legal framework for protecting wild animal and plant species, controlling poaching, and managing protected areas. This comprehensive national law established various legal schedules of varying protection levels and facilitated the creation of National Parks and Wildlife Sanctuaries.

14. (C) They receive absolute protection, with offences incurring the highest legal penalties
Schedule I of the Wildlife Protection Act, 1972 provides the highest tier of legal protection to endangered species in India. Hunting, capturing, or trading species listed in this schedule is strictly prohibited under law. Any violations involving Schedule I wildlife attract the most severe statutory penalties, including mandatory imprisonment and heavy monetary fines.

15. (B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
The Wildlife Protection Act, 1972 establishes a comprehensive legal prohibition against hunting wild animals listed across its protection schedules. Section 11 empowers the Chief Wildlife Warden to grant permission to hunt specific animals if they pose an immediate danger to human life or are diseased beyond recovery, presenting a valid legal exception rather than the fundamental justification.

16. (C) The Prime Minister of India
The National Board for Wildlife is an apex statutory authority established under the provisions of Section 5A of the Wildlife Protection Act, 1972. The Prime Minister of India serves as the ex-officio Chairperson of the board, which guides national policy framing, wildlife conservation strategies, and mandatory statutory clearances for developmental projects.

17. (B) The Central Government by notification
Under Section 62 of the Wildlife Protection Act, 1972, the Central Government possesses the legal authority to declare any wild animal, excluding species listed under Schedule I and Schedule II, as vermin for a specified geographic area and duration. Such official notification temporarily deprives the species of protection, permitting regulated management or culling.

panchayat elections

141. Which of the following is the official State Animal of Uttar Pradesh?
(A) Royal Bengal Tiger
(B) Asian Elephant
(C) Indian Blackbuck
(D) Swamp Deer

142. The Sarus Crane, known as the tallest flying bird in the world, holds which official status in Uttar Pradesh?
(A) State Bird
(B) State Heritage Animal
(C) National Bird
(D) State Migratory Species

143. Which of the following tree species is officially recognised as the State Tree of Uttar Pradesh?
(A) Banyan (Ficus benghalensis)
(B) Ashoka (Saraca asoca)
(C) Peepal (Ficus religiosa)
(D) Mango (Mangifera indica)

144. The State Flower of Uttar Pradesh, known for its vibrant red-orange colour and historical significance, is:
(A) Sacred Lotus
(B) Palash
(C) Marigold
(D) Royal Jasmine

145. Consider the following Tiger Reserves located in Uttar Pradesh:
I. Dudhwa Tiger Reserve
II. Pilibhit Tiger Reserve
III. Amangarh Tiger Reserve
IV. Ranipur Tiger Reserve
Which of the above reserves form part of the Terai Arc Landscape, vital for tiger conservation?
(A) I and II only
(B) I, II and III only
(C) II, III and IV only
(D) I, II, III and IV

146. The Nawabganj Bird Sanctuary, a prominent wetland in Unnao district of Uttar Pradesh, was renamed in 2015 in honour of which freedom fighter?
(A) Shaheed Bhagat Singh
(B) Pandit Ram Prasad Bismil
(C) Chandra Shekhar Azad
(D) Shaheed Mangal Pandey

147. Sandi Bird Sanctuary, established to protect migratory waterfowl, is located in which district of Uttar Pradesh?
(A) Raebareli
(B) Gonda
(C) Mainpuri
(D) Hardoi

148. Sur Sarovar, also known as Keetham Lake, is a designated Ramsar site situated in which district of Uttar Pradesh?
(A) Kanpur
(B) Mathura
(C) Agra
(D) Aligarh

149. In order to promote eco-tourism and ex-situ conservation of Asiatic Lions, the Uttar Pradesh government established a Lion Safari Park in which district?
(A) Gorakhpur
(B) Etawah
(C) Lucknow
(D) Varanasi

150. Consider the following Ramsar wetland sites in Uttar Pradesh:
I. Upper Ganga River (Brijghat to Narora)
II. Samaspur Bird Sanctuary
III. Parvati Arga Bird Sanctuary
IV. Sarsai Nawar Jheel
Which of the above are internationally recognized Ramsar sites situated within Uttar Pradesh?
(A) I and II only
(B) II, III and IV only
(C) I, III and IV only
(D) I, II, III and IV

151. What does the acronym CAMPA stand for in the context of Indian forest conservation funding?
(A) Compensatory Afforestation Fund Management and Planning Authority
(B) Central Afforestation and Forest Ecosystem Management Planning Agency
(C) Committee for Animal Habitat Management and National Protection Authority
(D) Conservation, Preservation and Mitigation of Organized Wildlife Poaching Act

152. The funds managed by CAMPA are primarily generated from which of the following sources?
(A) Voluntary financial contributions and international development grants provided by global environmental NGOs

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(B) Entrance registration fees and commercial photography tariffs collected from visiting eco-tourists in National Parks
(C) NPV and compensatory afforestation charges paid for diverting forest land
(D) Court-mandated criminal fines and penalties collected directly from convicted illegal wildlife poachers

153. The Global Environment Facility (GEF) provides international financial grants to developing countries primarily for addressing:
(A) Global environmental issues including biodiversity loss and climate change
(B) Universal primary education access and basic literacy programs in developing nations
(C) Civil nuclear energy infrastructure development and regional power grid modernization
(D) Peaceful international space exploration research and orbital satellite development

154. Under 'Project Tiger', a Centrally Sponsored Scheme, what is the typical funding pattern for recurring expenditure between the Central Government and State Governments (for states like UP)?
(A) 100% Central, 0% State
(B) 50% Central, 50% State
(C) 90% Central, 10% State
(D) 25% Central, 75% State

155. Consider the following steps regarding the generation and allocation of CAMPA funds:
I. Transfer of funds from the National Fund to the respective State CAMPA Fund
II. Diversion of forest land approved by the Central Government
III. Payment of NPV and compensatory levies by the project user agency into the National CAMPA Fund
IV. Utilisation of funds by the State Forest Department for afforestation and wildlife management
Which of the following represents the correct sequential order?
(A) II, III, I, IV
(B) III, II, I, IV
(C) II, I, III, IV
(D) I, II, III, IV

156. The National Afforestation and Eco-Development Board (NAEB) functions under which ministry to promote afforestation and ecological restoration in degraded forest areas?
(A) Ministry of Rural Development and Panchayati Raj
(B) Ministry of Agriculture and Farmers Welfare, Government of India
(C) Ministry of Environment, Forest and Climate Change
(D) Ministry of Jal Shakti (Department of Water Resources)

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157. In the context of wildlife health monitoring, what are 'zoonotic diseases'?
(A) Pathological diseases that exclusively infect captive wild animals housed within municipal zoological parks
(B) Hereditary genetic disorders brought about by severe inbreeding depression within isolated populations
(C) Fungal or bacterial plant diseases that systematically destroy upper forest canopy leaf cover
(D) Infectious diseases naturally transmissible between animals and humans

158. Canine Distemper Virus (CDV), traditionally associated with domestic dogs, has become a major conservation threat causing fatal outbreaks in the wild populations of which big cats in India?
(A) Tigers and lions
(B) Snow leopards and pumas
(C) Free-ranging cheetah populations
(D) Rare clouded leopards

159. Anthrax, a severe bacterial disease occasionally causing sudden mortality in wild elephants and herbivores, is primarily transmitted through:
(A) Vector bites from infected forest mosquitoes during monsoons
(B) Ingestion or inhalation of spores from contaminated soil or water
(C) Direct physical contact with infected wild monkey populations
(D) Accidental consumption of toxic or poisonous forest plant species

160. Match List I with List II:
List I: (Pathogen / Disease)
P. Kyasanur Forest Disease (KFD)
Q. Avian Influenza (H5N1)
R. Foot and Mouth Disease (FMD)
S. Elephant Endotheliotropic Herpesvirus (EEHV)

List II: (Commonly Affected Wildlife / Vector Context)

1. Migratory and domestic birds
2. Wild and captive Asian elephants
3. Tick-borne viral haemorrhagic fever affecting monkeys and humans
4. Wild herbivores (transmitted from domestic livestock)

(A) P-3, Q-1, R-4, S-2
(B) P-1, Q-2, R-3, S-4
(C) P-4, Q-3, R-2, S-1
(D) P-3, Q-4, R-1, S-2

161. The 'One Health' approach, increasingly adopted in India's wildlife health management, fundamentally recognizes the interconnectedness of:
(A) Interconnected human, animal, and ecosystem health
(B) Agricultural plant health and underlying soil microbial health only
(C) Public urban health services and rural community healthcare delivery
(D) Indigenous traditional medicine systems and modern clinical allopathy

162. How does the grazing of domestic livestock inside or on the fringes of protected areas pose a biological threat to wild herbivores like Gaur and Spotted Deer?
(A) Aggressive domestic livestock physically hunt and prey upon vulnerable wild herbivore species
(B) Habitat competition forces native wild herbivores to migrate permanently away into urban centers
(C) It facilitates disease spillover like Foot and Mouth Disease to wild populations
(D) Hybridization with livestock genetically alters native wild herbivore populations through cross-breeding

163. Nature Interpretation Centres established at the gates of National Parks are primarily intended to:
(A) Formally process park entry tickets and systematically collect vehicle parking fees
(B) Provide high-end luxury accommodation and dining facilities for visiting VIP tourists
(C) Serve as an official commercial marketplace for selling legally confiscated wildlife products
(D) Educate visitors on local biodiversity and conservation through exhibits

164. 'Wildlife Week' is celebrated annually across India to promote conservation awareness among citizens during which period?
(A) 1st to 7th June
(B) 2nd to 8th October
(C) 1st to 7th December
(D) 15th to 21st March

165. Which of the following represents the most logical sequence of steps in developing an effective community conservation awareness campaign?
(A) Implementation - Needs Assessment - Audience Identification - Evaluation
(B) Needs Assessment - Audience Identification - Message Design & Implementation - Evaluation
(C) Evaluation - Message Design - Implementation - Audience Identification
(D) Message Design - Evaluation - Needs Assessment - Implementation

166. In public awareness campaigns, what is the strategic advantage of using a 'Flagship Species' like the Tiger or the Elephant?
(A) Flagship species represent the only biological organisms in an ecosystem that genuinely require active conservation
(B) They represent the most genetically resilient animals that are exceptionally easy to breed within captive zoo facilities
(C) They possess minimal spatial habitat requirements, significantly reducing the financial costs of land conservation
(D) Charismatic symbols that rally public support and funding to protect entire ecosystems

167. Under 'Project Cheetah', an ambitious intercontinental translocation initiative, African Cheetahs were recently introduced into which Indian protected area?
(A) Kuno National Park, Madhya Pradesh
(B) Gir National Park, Gujarat
(C) Jim Corbett National Park, Uttarakhand
(D) Bandhavgarh National Park, Madhya Pradesh

168. Given below are two statements, one labelled as Assertion (A) and the other as Reason (R).
Assertion (A): The Government of India launched the MISHTI (Mangrove Initiative for Shoreline Habitats & Tangible Incomes) scheme in the 2023 budget.
Reason (R): Mangrove forests act as crucial bio-

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shields against coastal storms and are highly effective sinks for 'blue carbon'.

(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

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169. The 'Amrit Dharohar' scheme, recently introduced by the central government, focuses primarily on the optimal use and conservation of which specific ecosystems over the next three years?

(A) Ramsar wetlands
(B) High alpine meadows
(C) Urban heat islands
(D) High-altitude glaciers

170. Consider the following statements regarding the Forest (Conservation) Amendment Act, 2023:

I. It exempts certain categories of land from the purview of the principal Act, such as forest land situated within 100 km along international borders intended for strategic linear projects of national importance.
II. It expands the list of specified 'non-forest purposes' to include activities like silvicultural operations, establishment of zoos, and eco-tourism facilities approved by the government.
III. It completely removes the requirement of Central Government approval for mining activities in all forest areas.

Which of the above statements is/are correct?

(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II and III

ANSWERS

1. (B) To harvest forest resources at a rate that allows for natural regeneration
The concept of sustainable yield in forest management ensures that the annual or periodic removal of wood and other forest products does not exceed the ecosystem's net growth capacity. By balancing harvesting rates with natural regeneration and regrowth mechanisms, forests maintain their ecological integrity, resource availability, continuous productivity, and long-term vitality for future generations without degrading habitat quality.

2. (D) It is a forested or wooded area of land adjacent to a body of water such as a river or stream
Riparian forests are unique transition zones located along watercourses such as rivers, streams, lakes, and floodplains. These wooded corridors serve as crucial biological buffers, preventing soil erosion, filtering agricultural runoff, stabilizing riverbanks, and regulating water temperatures. Additionally, they provide essential habitat, wildlife corridors, and nutrient dynamics required for aquatic and terrestrial biodiversity residing within river basin systems.

3. (A) Afforestation is the creation of a new forest where there was none historically, while reforestation is restoring a depleted forest
Afforestation involves establishing a forest on land that previously lacked tree cover or was not historically forested for a prolonged period, converting non-forest landscapes into wooded areas. In contrast, reforestation refers to the replanting or natural regeneration of trees on degraded lands or harvested areas where forest cover previously existed, thereby restoring degraded ecosystems.

4. (C) The long-term storage of carbon in plants, soils, and geologic formations
Carbon sequestration refers to the atmospheric process where vegetation absorbs carbon dioxide through photosynthesis and stores it for extended durations within plant biomass, root systems, and forest soils. By acting as major carbon sinks, forest ecosystems effectively mitigate global warming by removing greenhouse gases from the active carbon cycle and stabilizing overall atmospheric gas compositions.

5. (A) They contain diverse habitats and undisturbed ecological niches
Old-growth forests represent structural climax ecosystems characterized by multi-layered canopy structures, ancient standing trees, abundant decaying wood, and complex soil microbial networks. Because these environments remain free from recent severe human disturbances, they offer specialized ecological niches, stable microclimates, and complex structural resources necessary to sustain specialized, highly vulnerable, and endemic species populations.

6. (D) Prevention of soil erosion and regulation of downstream water flow
Healthy forest canopies and dense root networks within watershed ecosystems significantly intercept rainfall, slow surface runoff, and promote groundwater recharge. By binding soil particles together, forests prevent soil erosion, reduce river siltation, moderate seasonal flood peaks, and maintain consistent dry-season water yields, delivering vital hydrologic regulatory benefits and ecological stabilization to downstream communities.

7. (B) Its presence is critical to maintaining overall ecosystem structure and balance
Keystone species exercise a disproportionately large effect on their natural ecosystem relative to their biological abundance or biomass. Their removal or decline triggers cascading structural shifts, causing ecosystem degradation or dramatic collapse. Protecting these organisms preserves vital ecological interactions, maintains food web stability, regulates prey populations, and protects the overarching biodiversity and functional integrity of habitats.

8. (C) A species restricted exclusively to a specific geographic region
Endemic species are organisms whose natural geographic distribution is strictly restricted to a defined geographical territory, such as a single island, mountain range, or river basin. Because these species possess specialized environmental

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and Other Traditional Forest Dwellers Act
(B) Municipal limits of metropolitan cities
(C) Areas comprised within a National Park or a Sanctuary
(D) Revenue lands of state governments

133. Once an area is declared as a Community Reserve, what happens to the hunting rights within that area?
(A) Hunting rights are preserved exclusively for recognized indigenous members of the local community
(B) Hunting of wild animals is prohibited, as in a National Park or Sanctuary
(C) Controlled hunting is permitted for regulated sport and recreational activities with written panchayat permission
(D) Commercial hunting is permitted provided all harvested meat is sold directly to the state forest department

134. Which authority is legally empowered to notify an area as a Community Reserve under the Wildlife (Protection) Act, 1972?
(A) The Supreme Court of India acting on a recommendation from the Central Empowered Committee
(B) The Central Government directly through a formal gazette notification published by the Environment Ministry
(C) The executive District Magistrate acting independently under administrative discretionary powers
(D) The State Government, after consulting the local community or landowner

135. In contrast to Community Reserves, a 'Conservation Reserve' is typically declared on which type of land?
(A) Government land adjacent to or connecting protected areas
(B) Privately owned prime agricultural land located far from any designated forest boundaries
(C) Unutilized urban wasteland parcels owned and administered by local city municipalities
(D) Newly reclaimed coastal land areas constructed from the sea

136. What is the primary ecological utility of establishing a Conservation Reserve?
(A) To provide low-cost government land for commercial and heavy industrial development projects
(B) To grant legal permission for commercial large-scale timber logging operations in forest fringe zones
(C) To serve as a buffer zone or corridor protecting adjacent National Parks
(D) To systematically and permanently resettle urban slum populations into peripheral forest fringe lands

137. Which state government authority must be consulted before a Conservation Reserve is declared?
(A) The State Board for Wildlife
(B) The Finance Commission of the State
(C) The State Election Commission
(D) The State Human Rights Commission

138. Consider the following statements regarding the differences between Conservation Reserves and Community Reserves:
I. Conservation Reserves are declared on government land, whereas Community Reserves are on private or community land.
II. Both reserves aim to protect landscapes, seascapes, flora, and fauna with local participation.
III. The declaration of either reserve completely alters the land ownership titles in favour of the Central Government.
Which of the above statements is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II and III

139. The Asan Conservation Reserve, which became the first Ramsar site of its state, is located in:
(A) Himachal Pradesh
(B) Uttarakhand
(C) Uttar Pradesh
(D) Punjab

140. Does the declaration of a Conservation Reserve affect the rights of people living inside the area?
(A) Yes, all traditional land and residency rights are immediately and permanently extinguished
(B) Yes, affected community residents are forcibly relocated to resettlement colonies in another district
(C) No, rights of residents inside a Conservation Reserve are unaffected
(D) Yes, residents permanently lose their legal rights to vote in local municipal and

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18. (B) Chapter IIIA
Chapter IIIA was inserted into the Wildlife Protection Act, 1972 through an amendment in 1991 to specifically govern the protection of specified plants. Provisions under this chapter prohibit the picking, uprooting, collection, possession, sale, or transportation of specified plant species listed in the legal schedules without proper authorization from designated forest authorities.

19. (A) Any whole or partial preserved specimen of a captive or wild animal
Under the Wildlife Protection Act, 1972, a trophy refers to the whole or any part of any captive or wild animal that has been preserved, taxidermied, or mounted by natural or artificial means. This definition encompasses items like skins, horns, antlers, tusks, bones, feathers, eggs, and nests, subjecting them to strict legal ownership and transfer restrictions.

20. (C) Four
The Wildlife Protection Amendment Act, 2022 streamlined the regulatory framework by reducing the total number of schedules from six to four. Schedules I and II now provide high protection to wild animals, Schedule III lists protected plant species, and Schedule IV incorporates specimens listed under the Appendices of CITES to regulate international trade compliance effectively.

21. (A) It prohibits state governments from diverting forest land for non-forest purposes without Central Government approval
Section 2 of the Forest Conservation Act, 1980 restricts state governments and authorities from de-reserving reserved forests, utilizing forest land for non-forest purposes, leasing forest land to private entities, or clearing naturally grown trees without obtaining mandatory prior approval from the Central Government. This law ensures centralized oversight over forest conversion across India.

22. (A) I and II only
The Forest Conservation Act, 1980 applies across all state territories in India. Non-forest purposes explicitly include commercial agricultural cultivation, such as growing tea, coffee, rubber, spices, or horticultural crops on forest land. Conversely, silvicultural operations and activities directly aimed at forest conservation, management, or natural reforestation are excluded from the non-forest purpose definition.

23. (B) To advise the Central Government regarding approvals for forest land diversion
The Forest Advisory Committee is a statutory committee constituted under Section 3 of the Forest Conservation Act, 1980. Composing forestry experts and administrative officials, the committee rigorously evaluates project proposals involving forest land diversion and tenders advisory recommendations to the Central Government regarding grant or rejection of environmental clearances and mitigation terms.

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24. (C) A charge compensating for the loss of tangible and intangible forest ecosystem services
Net Present Value represents a mandatory monetary charge collected from user agencies diverting forest land for non-forestry projects. It quantifies the present financial value of lost ecological services over decades, including timber, soil conservation, microclimate regulation, hydrological balance, and biodiversity support, ensuring financial compensation for the irreversible loss of natural ecosystem benefits.

25. (D) T.N. Godavarman Thirumulpad v. Union of India (1996)
In the landmark T.N. Godavarman Thirumulpad versus Union of India case in 1996, the Supreme Court significantly expanded the interpretation of forest under the Forest Conservation Act, 1980. The court ruled that the statute applies to all lands matching the dictionary meaning of forest, irrespective of legal ownership, classification, or recorded government status.

26. (A) An officer designated by the State, typically a Conservator of Forests
Under the Forest Conservation Rules, state governments designate a senior forestry official, usually of the rank of Conservator of Forests or Nodal Officer, to manage forest clearance proposals. This designated officer receives, examines, processes, and coordinates project applications across state departments before forwarding finalized documentation to the Central Government for approval.

27. (B) Degraded forest land twice the diverted area, or equivalent non-forest land
Compensatory afforestation under the Forest Conservation Act requires project proponents

diverting forest land to provide non-forest land equal in area to the diverted region. If suitable non-forest land is unavailable, afforestation must be undertaken over degraded forest land equal to double the extent of the diverted area, ensuring ecological compensation.

28. (B) An extremely high risk of extinction in the wild in the immediate future
Under the IUCN Red List criteria, a species is classified as Critically Endangered when scientific evidence indicates that it meets specific threshold reductions in population size, geographic distribution, or fragmented habitat range. This designation signifies that the taxon faces an extremely high risk of complete biological extinction in the wild.

29. (A) Gland, Switzerland
The International Union for Conservation of Nature was founded in 1948 and maintains its global headquarters in Gland, Switzerland. As a global authority on the status of the natural world, IUCN brings together governmental and non-governmental entities to collect ecological data, inform international environmental conventions, and guide global conservation action.

30. (C) I, III, and IV only
The IUCN Red List groups species facing high extinction risks into three distinct threatened categories: Vulnerable, Endangered, and Critically Endangered. Near Threatened species are evaluated as close to qualifying for a threatened threshold but do not currently meet the rigorous criteria, placing them outside the formal collective group of threatened species.

31. (D) The taxon survives only in captivity, cultivation, or outside its historic range
The IUCN Red List category Extinct in the Wild applies to taxa whose thorough natural surveys fail to record any living individual within historical wild habitats. Taxa in this category survive exclusively in human-managed captive environments, ex-situ living collections, botanical gardens, or as naturalized populations established entirely outside their historical geographic range.

32. (C) International Union for Conservation of Nature (IUCN)
The Red Data Book is compiled and published globally by the International Union for Conservation of Nature. It serves as a comprehensive inventory detailing the global conservation status, population trends, ecological threats, and extinction risks of thousands of plant, animal, and fungal species evaluated under standardized scientific assessment criteria.

33. (B) Inadequate information exists to evaluate its extinction risk
A species is categorized as Data Deficient on the IUCN Red List when available information regarding its abundance, distribution patterns, population trends, or ecological threats is insufficient to perform a direct or indirect assessment of its extinction risk. This label indicates that further research and data collection are urgently required.

34. (D) A very high risk of extinction in the wild
According to IUCN Red List criteria, a taxon is categorized as Endangered when it does not meet the extreme criteria for Critically Endangered but faces a very high risk of extinction in the wild in the near future, determined through significant population declines, severe habitat fragmentation, or geographic range reduction.

35. (A) Its scales for traditional medicine, and its meat
The Indian Pangolin faces severe poaching and illegal wildlife trade driven primarily by international demand for its keratinous scales, which are falsely believed to possess therapeutic properties in traditional medicine. Additionally, its meat is heavily poached for local human consumption and luxury bushmeat markets, leading to rapid population declines across its range.

36. (C) Keratin
Rhinoceros horns are composed entirely of keratin, a fibrous structural protein that forms human hair, fingernails, and animal hooves. Unlike mammalian horns that contain a bony core, rhino horns are dense agglutinated keratin structures without bone or dentine, making poaching for medicinal claims scientifically baseless and biologically unsupported.

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37. (A) Asiatic Black Bear
The Asiatic Black Bear is heavily targeted by poachers across parts of Asia to extract bile from its gallbladder. Bear bile contains ursodeoxycholic acid, which is utilized in traditional Asian medicine. This high commercial demand drives severe illegal poaching, captive bear farming, and wild population declines across mountainous forest ranges.

38. (B) II, IV, I, III
The illegal wildlife trade supply chain follows a structured sequence. It begins with poaching and illegal extraction from natural habitats, followed by consolidation and storage by localized middlemen. Next, contraband is moved through international transit or border smuggling networks, concluding with retail distribution and sale to end consumers in illicit markets.

39. (B) Tibetan Antelope
The illegal commercial production of luxury Shahtoosh shawls relies on processing the extremely fine underfur of the Tibetan Antelope, or Chiru. Because collecting this soft wool requires killing the animal, illegal hunting for the Shahtoosh trade severely depleted wild populations across the high-altitude Tibetan plateau, prompting strict legal protection.

40. (C) Confiscation of vehicles, weapons, and tools used in offences
Under the Wildlife Protection Act, 1972, law enforcement agencies are empowered to seize and confiscate all weapons, traps, equipment, vehicles, and vessels used in committing wildlife offences. Depriving poachers and trafficking syndicates of their physical assets serves as a major legal deterrent against organized wildlife crime operations across India.

41. (D) Wildlife Crime Control Bureau
WCCB stands for the Wildlife Crime Control Bureau. It is a statutory, multi-disciplinary body established by the Government of India under the Wildlife Protection Act, 1972. The bureau collects intelligence, coordinates enforcement operations among various agencies, maintains central crime databases, and assists international enforcement bodies in combating organized wildlife trafficking.

42. (A) Ministry of Environment, Forest and Climate Change
The Wildlife Crime Control Bureau functions under the administrative oversight of the Ministry of Environment, Forest and Climate Change, Government of India. Operating from its headquarters in New Delhi and regional offices, the bureau works alongside police, customs, and border forces to prevent illegal wildlife trade and enforce wildlife laws.

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43. (B) Turtles and tortoises
Operation Save Kurma was a targeted enforcement initiative conducted by the Wildlife Crime Control Bureau to combat the illicit trade and poaching of live freshwater turtles and tortoises. The operation focused on dismantling poaching networks, seizing illegal shipments, strengthening inter-agency coordination, and enforcing protection under the Wildlife Protection Act.

44. (B) Mongoose
Operation Clean Art was launched across India by the Wildlife Crime Control Bureau to curb the illegal trade in mongoose hair used for manufacturing fine artist paintbrushes. Because mongooses are killed in vast numbers to harvest their hair, this enforcement drive targeted production workshops, seized contraband brushes, and prosecuted violators.

45. (A) P-2, Q-1, R-4, S-3
Operation Softgold targeted illegal smuggling of Tibetan Antelope wool used in Shahtoosh shawls. Operation Wildnet focused on monitoring illegal wildlife trade operating across internet platforms. Operation Birbidi targeted the illegal trade in wild birds. Operation Thunderbird was a multi-agency global enforcement operation combating multi-species wildlife crime across national borders.

46. (C) Monitoring trade in wild plants and animals to ensure sustainability
TRAFFIC is a leading global wildlife trade monitoring network established jointly by WWF and IUCN. The organization conducts scientific research, tracks international wildlife trade movements, provides intelligence to law enforcement agencies, and supports policy enforcement to ensure that trade in wild plants and animals does not threaten global biodiversity conservation.

allowing mathematical modeling of detection probabilities across habitats.

106. (A) A software system for tiger patrol logging and ecological monitoring
M-STrIPES stands for Monitoring System for Tigers - Intensive Protection and Ecological Status. It is a mobile and GIS-based technological application developed by the National Tiger Conservation Authority and Wildlife Institute of India to standardize field patrolling, track forest guard coverage, record wildlife sightings, and monitor habitat disturbances across reserves.

107. (B) Deer and ungulates
The pellet count method is an indirect sign survey technique used by wildlife researchers to estimate the relative abundance and distribution of deer and ungulates. By systematically sampling fecal pellet group accumulation along fixed transects, researchers can model population density based on known defecation rates and decay speeds.

108. (A) Acoustic call count method
The acoustic call count method is an effective census technique used during the breeding season to estimate bird populations, such as peafowl and pheasants. Field surveyors record species-specific territorial calls or mating vocalizations along fixed sampling points during peak calling hours to assess relative abundance and breeding activity.

109. (A) Marked to total animals in the second catch
The mark-recapture method estimates total population size based on Lincoln-Petersen index principles. Researchers capture, mark, and release a sample of individuals. In a subsequent sampling event, the ratio of marked individuals to total animals captured reflects the proportion of marked animals in the entire population, enabling statistical estimation.

110. (D) I, II, III and IV
CITES regulates international wildlife trade across three appendices based on species threat levels. Appendix I prohibits commercial trade in endangered species. Appendix II regulates trade in non-threatened species to prevent overexploitation. Appendix III contains species listed by individual party nations. CITES is legally binding but relies on national implementing legislation.

111. (B) 1975
The Convention on International Trade in Endangered Species of Wild Fauna and Flora was drafted in 1973 at a meeting of IUCN members and entered into international legal force on July 1, 1975. CITES provides an international framework regulating cross-border movement and trade in wildlife specimens.

112. (B) By issuing export permits only when trade will not jeopardize species survival
CITES ensures sustainable trade in Appendix II species by requiring mandatory export permits issued by designated national scientific authorities. These permits are granted only after determining formal non-detriment findings, confirming that exporting specimens will not compromise wild population survival or overall ecological stability, thereby maintaining sustainable international utilization levels.

113. (A) The Earth Summit (UNCED) in Rio de Janeiro
The Convention on Biological Diversity was opened for signature at the United Nations Conference on Environment and Development, popularly known as the Earth Summit, held in Rio de Janeiro, Brazil, in June 1992. The convention established global commitments for biodiversity conservation, sustainable resource use, and equitable benefit sharing.

114. (C) Safe handling, transport, and use of living modified organisms from biotechnology
The Cartagena Protocol on Biosafety is an international treaty supplementary to the Convention on Biological Diversity. Adopted in 2000, it aims to protect biological diversity from potential risks posed by living modified organisms resulting from modern biotechnology, establishing regulations governing their transboundary movement, risk assessment, and safe handling.

115. (D) Nagoya Protocol
The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is a supplementary agreement to the CBD adopted in 2010. It establishes a transparent legal framework ensuring fair benefit sharing between providers and users of genetic resources and traditional knowledge.

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species populations to continue evolutionary processes, interact dynamically with their environment, and maintain long-term population viability naturally.

58. (A) Biosphere Reserve
A Biosphere Reserve is a classic example of in-situ conservation, where whole natural ecosystems are protected within their native geographic settings. Unlike botanical gardens, zoological parks, or safari enclosures, biosphere reserves preserve wild flora and fauna alongside their ecological relationships, evolutionary drivers, and natural environmental processes in an undisturbed setting.

59. (B) Forest patches protected by local communities based on cultural or religious beliefs
Sacred Groves are forest fragments preserved by local indigenous communities through traditional religious beliefs, cultural taboos, and ancestral spiritual practices. By forbidding logging, hunting, and resource extraction within these dedicated sites, traditional communities have successfully protected ancient biodiversity refuges, rare plant species, and local hydrological features over generations.

60. (B) I and III only
In-situ conservation enables wild organisms to continuously adapt and evolve alongside dynamic environmental changes within natural habitats. It protects multi-trophic interactions, soil microflora, and non-target organisms across entire landscapes simultaneously. Furthermore, in-situ conservation is generally more cost-effective per species than long-term intensive ex-situ captive breeding and maintenance programs.

61. (A) To protect marine ecosystems, biodiversity, and habitats like coral reefs
Marine Protected Areas are designated oceanic and coastal regions managed to conserve marine biodiversity, fragile habitats, coral reefs, and critical nursery grounds for marine life. Restricting destructive industrial activities, overfishing, and seabed resource extraction within MPAs helps restore fish stocks, enhances ocean resilience, and protects vulnerable aquatic species.

62. (C) They link fragmented habitats, enabling genetic exchange and wildlife migration
Wildlife Corridors are linear habitat strips connecting isolated protected forest patches across fragmented landscapes. By providing safe movement passages for wild animals, corridors facilitate seasonal migration, lower human-wildlife conflicts, prevent genetic bottlenecks through continuous gene flow, and improve long-term population viability for wide-ranging mammalian species.

63. (D) Conserving biodiversity components outside their natural habitats
Ex-situ conservation involves protecting and preserving components of biological diversity outside their natural environmental habitats. Facilities such as botanical gardens, zoological parks, gene banks, seed banks, and cryopreservation units safeguard endangered plants and animals under controlled artificial conditions, offering insurance against sudden species extinction in the wild.

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64. (C) Liquid nitrogen
Cryopreservation in ex-situ conservation uses liquid nitrogen maintained at an extremely low temperature of minus 196 degrees Celsius. At this ultra-cold temperature, all biological cellular metabolic activities and chemical reactions cease completely, allowing long-term storage and viability preservation of seeds, pollen, tissue samples, embryos, and genetic materials for centuries.

65. (B) To preserve plant genetic diversity as an insurance against extinction
A Seed Bank is a specialized ex-situ conservation facility designed to store seeds from diverse wild plant species and agricultural crop varieties under controlled low temperature and humidity. By preserving viable genetic material, seed banks safeguard plant biodiversity against environmental disasters, disease outbreaks, habitat destruction, and climate change impacts.

66. (C) 1992
The Central Zoo Authority is a statutory body established by the Government of India in 1992 under an amendment to the Wildlife Protection Act, 1972. CZA oversees and regulates all zoological parks across the country, enforcing minimum standards of animal healthcare,

47. (A) One
The state of Uttar Pradesh has exactly one officially notified National Park, which is the Dudhwa National Park located in the Lakhimpur Kheri district. Established in 1977, this national park protects dense Terai ecosystem habitats, swamp deer populations, tigers, Asian elephants, and a rich variety of bird species.

48. (C) Lakhimpur Kheri
Dudhwa National Park is situated in the Lakhimpur Kheri district of Uttar Pradesh, along the Indo-Nepal border region. Representing one of the few remaining pristine pockets of the Terai ecosystem, the park features tall grasslands, sal forests, and extensive wetlands that shelter endangered species like swamp deer and one-horned rhinoceroses.

49. (B) Core Zone
In the standardized zonation framework of a Biosphere Reserve, the Core Zone is legally protected and strictly managed to preserve natural ecological processes. Human activities, including resource extraction, grazing, and settlement, are prohibited within this undisturbed area, with only non-destructive scientific research, ecological monitoring, and conservation activities permitted.

50. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Under the Wildlife Protection Act, 1972, National Parks enjoy the highest level of legal protection, strictly prohibiting human settlements, resource extraction, and livestock grazing within their boundaries. This stringent legal status aims to maintain pristine ecosystem conditions, minimize anthropogenic disturbance, and ensure uninterrupted survival space for native biodiversity.

51. (A) Shravasti, Balrampur, Gonda
The Suhelwa Wildlife Sanctuary is located along the Indo-Nepal border in northern Uttar Pradesh, spanning across the districts of Shravasti, Balrampur, and Gonda. Covering dense sal forest tracts in the Terai region, this sanctuary provides vital habitat for tigers, leopards, wild Asian elephants, and diverse avian fauna.

52. (C) Gautam Buddha Nagar
The Okhla Bird Sanctuary is situated on the Yamuna River at the boundary where Delhi meets the Gautam Buddha Nagar district of Uttar Pradesh. This urban wetland sanctuary acts as a critical haven for resident waterbirds and thousands of winter migratory birds navigating the Central Asian Flyway.

53. (A) Chandraprabha Wildlife Sanctuary
Established in 1957, Chandraprabha Wildlife Sanctuary, located in the Chandauli district, is the oldest wildlife sanctuary in Uttar Pradesh. Created initially as a reserve area for reintroducing Asiatic lions, the sanctuary covers dry deciduous forests and waterfalls along the Vindhyan range, supporting diverse native mammalian and avian wildlife.

54. (D) Grazing may be allowed in a Sanctuary, but is prohibited in a National Park
Under the Wildlife Protection Act, 1972, National Parks offer complete ecosystem protection where livestock grazing and human resource collection are legally prohibited. In contrast, Chief Wildlife Wardens may regulate or permit limited livestock grazing and traditional community rights within a Wildlife Sanctuary, provided such activities do not compromise conservation objectives.

55. (B) Hastinapur Wildlife Sanctuary
Covering over 2,073 square kilometers, Hastinapur Wildlife Sanctuary is the largest wildlife sanctuary by area in Uttar Pradesh. Spanning across several western districts along the Gangetic plains, it encompasses riverine wetlands, tall grasslands, and agricultural matrices that protect species such as the swamp deer, gharial, and Gangetic dolphin.

56. (C) Bundelkhand region
Ranipur Tiger Reserve, notified as the fourth tiger reserve in Uttar Pradesh, is located in the Chitrakoot district within the Bundelkhand region. Consisting of dry deciduous forests, hills, and riverine habitats, this reserve serves as a critical tiger conservation landscape linking forest patches between Uttar Pradesh and Madhya Pradesh.

57. (D) Conserving ecosystems and viable species populations in their natural habitats
In-situ conservation refers to the management and protection of biological diversity directly within its natural habitat. By preserving wild ecosystems, protected areas like national parks, biosphere reserves, and sanctuaries allow wild

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harvest resources from surrounding civil forests, balancing localized ecological conservation effectively with essential rural livelihood requirements.

77. (A) Protected Areas (National Parks and Sanctuaries)
Eco-development Committees are established around protected areas, such as national parks and wildlife sanctuaries, to engage local fringe communities in participatory conservation. EDCs provide alternative livelihood opportunities, sustainable energy alternatives, and community development benefits, effectively reducing local economic dependence on forest resource collection and curbing human-wildlife conflicts.

78. (A) Forest (Conservation) Act - National Forest Policy emphasising JFM - Forest Rights Act
India's participatory forest governance evolved chronologically through key legislative milestones. The Forest Conservation Act was enacted in 1980 to centralize forest land diversion control. The 1988 National Forest Policy formally integrated community participation through Joint Forest Management guidelines. Finally, the Forest Rights Act of 2006 recognized traditional forest dwelling land rights.

79. (D) Wildlife conservation
The Amrita Devi Bishnoi National Award is instituted by the Government of India in honor of Amrita Devi Bishnoi and fellow villagers who sacrificed their lives in 1730 protecting sacred Khejri trees. The national award recognizes individuals or village communities demonstrating exceptional courage, dedication, and service in wildlife and forest conservation.

80. (C) Hugging trees to physically prevent loggers from felling them
The Chipko Movement began in the early 1970s in the Garhwal Himalayas of Uttarakhand as a landmark grassroots non-violent environmental resistance. Villagers, led predominantly by local women, physically hugged forest trees to block commercial loggers from felling them, successfully demonstrating community empowerment and inspiring ecological conservation movements worldwide.

81. (B) Convention on Biological Diversity (CBD)
India developed its National Biodiversity Action Plan to fulfill statutory commitments under the international Convention on Biological Diversity. The plan provides a comprehensive policy framework for conserving biological diversity, promoting sustainable resource utilization, ensuring fair benefit sharing, and aligning national conservation efforts with evolving global biodiversity targets.

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82. (D) Chennai
The National Biodiversity Authority is an autonomous statutory body established in 2003 by the Central Government to implement the Biological Diversity Act, 2002. Headquartered in Chennai, Tamil Nadu, NBA regulates access to biological resources, advises state governments, and enforces fair trade and benefit sharing mechanisms across India.

83. (A) To prepare and maintain the People's Biodiversity Register
Under Section 41 of the Biological Diversity Act, 2002, local governing bodies establish Biodiversity Management Committees within their jurisdictions. The primary statutory duty of a BMC is to prepare and maintain the People's Biodiversity Register in consultation with local residents, documenting bio-resources, traditional knowledge, and biological conservation practices.

84. (C) Information on local biological resources and traditional knowledge
The People's Biodiversity Register is a comprehensive statutory document prepared at the local community level. It records detailed information on locally available biological resources, their medicinal or economic uses, ongoing ecological dynamics, and associated traditional knowledge held by indigenous communities, safeguarding local rights against biopiracy and unauthorized exploitation.

85. (A) P-3, Q-4, R-1, S-2
Under India's biological diversity framework, the National Biodiversity Authority operates at the national level. State Biodiversity Boards manage biological governance at the state level. Biodiversity Management Committees function at local body levels. Access and Benefit Sharing serves as the statutory financial and commercial regulatory mechanism governing biological resource usage.

housing, safety, technical management, and captive breeding programs.

67. (A) West Bengal
The Acharya Jagadish Chandra Bose Indian Botanic Garden is located at Howrah in West Bengal. Established in 1787, it is one of Asia's oldest botanical gardens, renowned worldwide for ex-situ plant conservation, extensive living collections of rare flora, and the iconic Great Banyan Tree spanning a vast area.

68. (C) Captive breeding of endangered species and conservation education
Modern zoological parks serve as vital conservation facilities rather than simple entertainment venues. Their primary scientific objectives include executing managed captive breeding programs for threatened species, supporting wildlife reintroduction efforts, advancing public conservation education, conducting veterinary research, raising environmental awareness, and fostering broad public support for natural ecosystem preservation.

69. (A) To multiply populations in captivity for reintroduction into the wild
The ultimate ecological goal of a captive breeding program is to maintain genetically diverse, healthy animal populations in human-managed facilities to prevent total species extinction. These programs aim to successfully reintroduce captive-bred individuals back into restored natural habitats, rebuilding self-sustaining wild populations and restoring degraded ecosystem functions.

70. (A) II, IV, III, I
A systematic captive breeding and reintroduction program follows a structured sequence. It begins with selecting genetically diverse founder animals, followed by breeding under controlled captive environments. Next, animals undergo acclimatization in semi-wild enclosures during a soft release phase, concluding with post-release monitoring and long-term wild habitat protection.

71. (B) Diclofenac
Vulture Conservation Breeding Centres were established across India to prevent the near-extinction of Gyps vulture species caused by Diclofenac. This non-steroidal anti-inflammatory drug, administered to domestic cattle, causes fatal kidney failure in vultures scavenging on treated livestock carcasses, driving catastrophic population crashes across South Asia.

72. (C) Gharial
The Gharial, a critically endangered fish-eating crocodilian native to the Indian subcontinent, was rescued from near extinction through the Crocodile Conservation Project initiated in 1975. Using captive egg incubation and rearing programs at facilities like Kukrail in Uttar Pradesh, thousands of young gharials were successfully reintroduced into protected river systems.

73. (D) Reduced biological fitness and survival from mating closely related individuals
Inbreeding depression occurs when closely related individuals mate within small, isolated captive or wild populations. This process increases homozigosity, bringing out deleterious recessive alleles that cause reduced fertility, higher offspring mortality, developmental abnormalities, compromised immune functions, and diminished overall biological fitness, threatening long-term species survival.

74. (A) A registry tracking pedigree and demography to manage genetic diversity
A Studbook in zoo management is a detailed genealogical register that tracks the complete pedigree, lineage, birth dates, and demographic histories of individual captive animals of a species. Managers use studbooks to plan conservation breeding programs, calculate kinship coefficients, prevent inbreeding depression, and maintain maximum genetic diversity.

75. (B) Arabari, West Bengal
Joint Forest Management in India traces its origins to the Arabari forest range in the Paschim Medinipur district of West Bengal in 1971. Forest officer A.K. Banerjee engaged local villagers to protect degraded sal forests in exchange for employment, fuel, fodder rights, and a share of timber proceeds.

76. (B) Van Panchayats
Van Panchayats are autonomous community-based institutions unique to the hill state of Uttarakhand. Formalized under specific regulatory rules in 1931, these democratic local bodies empower village communities to collectively manage, protect, and sustainably

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96. (C) Central Zoo Authority (CZA)
Under Section 38H of the Wildlife Protection Act, 1972, the Central Zoo Authority is legally empowered to issue mandatory technical guidelines, health standards, and structural parameters for rescue facilities housing wild animals in India. CZA regulates their operational functioning, ensuring appropriate veterinary standards and animal welfare parameters.

97. (B) Radio or GPS telemetry collars
Radio and GPS telemetry collars are advanced technological tools used by wildlife scientists for post-release monitoring of rehabilitated large carnivores. These tracking devices transmit precise real-time geographic location data via VHF radio signals or satellites, allowing researchers to evaluate territorial establishment, movement patterns, habitat utilization, and survival rates.

98. (D) A sharp reduction in population size leading to a loss of genetic variation
A genetic bottleneck occurs when a species experiences a dramatic, temporary reduction in population size due to environmental disasters, habitat destruction, or extreme overhunting. This sharp demographic collapse randomly eliminates alleles, reducing overall genetic diversity and increasing vulnerability to disease outbreaks, environmental changes, and inbreeding depression.

99. (A) A new population is founded by very few individuals, causing reduced genetic diversity
The founder effect is a genetic phenomenon that occurs when a small group of individuals separates from a larger main population to establish a new colony. Because the founding individuals carry only a small fraction of the original genetic variation, the new population exhibits restricted genetic diversity and unique allele frequencies.

100. (C) Collecting naturally shed hair or feces to extract DNA
Non-invasive genetic sampling involves collecting biological specimens, such as naturally shed hair, scats, feathers, or sloughed skin, without capturing, handling, or disturbing wild animals. DNA extracted from these non-invasive samples allows researchers to identify species, analyze genetic diversity, estimate population sizes, and track animal movements safely.

101. (A) The smallest population size likely to survive long-term despite random uncertainties
Minimum Viable Population is a fundamental concept in conservation biology referring to the smallest isolated population size required for a species to maintain a high probability of long-term survival. MVP calculations rigorously account for demographic stochasticity, environmental fluctuations, genetic drift, and catastrophic natural disasters over a specified timeframe.

102. (D) I, II and III
Conservation genetics applies modern molecular techniques directly to wildlife protection. It clarifies taxonomic classifications by detecting cryptic species, assists wildlife forensic investigations by accurately identifying contraband animal tissue, and evaluates gene flow and genetic connectivity across fragmented landscapes, directly aiding resource managers in designing effective habitat corridors and translocation strategies.

103. (B) Tiger
The traditional pugmark census technique was historically used across Indian forest reserves to estimate wild tiger populations. Field trackers recorded individual tiger footprints using plaster casts and glass tracing frames, carefully analyzing distinct pad shapes, toe alignments, and track measurements to differentiate individual tigers and assess local abundance across forest landscapes.

104. (C) Unique natural markings like coat stripe or rosette patterns
Modern camera trap census methods rely on automated photographs to identify individual animals in species with unique natural pelage markings. Tigers possess distinct, lifelong stripe patterns, while leopards exhibit unique rosette configurations. Advanced image-matching algorithms analyze these visual markings to accurately estimate population densities through mark-recapture models.

105. (D) Terrestrial large herbivores and ungulates
The line transect method is a widely used distance-sampling technique for estimating the population density of large terrestrial herbivores and ungulates. Field observers walk systematically along predetermined straight paths, recording observed animals, cluster sizes, and perpendicular distances from the line,

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86. (D) Equitable sharing of benefits from using biological resources and traditional knowledge
Access and Benefit Sharing is a central regulatory mechanism under the Biological Diversity Act, 2002 and the Nagoya Protocol. It ensures that commercial users of biological resources and traditional knowledge share financial, technological, or developmental benefits equitably with local provider communities and conserving authorities who safeguard those genetic resources.

87. (B) Giant Panda
The Giant Panda serves as the globally recognized official emblem logo of the World Wide Fund for Nature. Inspired by Chi-Chi, a giant panda transferred to the London Zoo in 1961, the iconic black-and-white symbol was adopted to represent WWF's commitment to conserving endangered wildlife and pristine natural habitats worldwide.

88. (C) Bombay Natural History Society (BNHS)
Founded in 1883, the Bombay Natural History Society is one of India's oldest and premier non-governmental organizations dedicated to natural history, fauna research, and biodiversity conservation. BNHS conducts extensive bird ringing programs, scientific field research, ecological surveys, habitat assessments, and environmental education initiatives across the Indian subcontinent.

89. (D) Mobile Veterinary Service units and wildlife rescue centres
The Wildlife Trust of India is a leading national non-profit conservation organization. WTI works in close partnership with state forest departments, operating specialized Mobile Veterinary Service units and wildlife rescue centers to provide emergency medical care, rehabilitation, and release services for displaced, injured, or orphaned wild animals.

90. (A) Northeast India (Assam)
Aaranyak is a prominent scientific research and nature conservation organization based in Assam, focusing its environmental initiatives primarily across Northeast India. The organization conducts biodiversity surveys, combats wildlife trafficking, manages human-elephant conflicts, and strengthens community-based conservation initiatives across ecologically sensitive habitats in the Eastern Himalayan region.

91. (B) They gather wildlife trade intelligence to assist enforcement agencies
Non-governmental organizations like the Wildlife Protection Society of India play a vital supporting role in wildlife law enforcement. WPSI gathers covert field intelligence on poaching networks and illegal trade syndicates, maintains detailed wildlife crime databases, and collaborates closely with governmental enforcement agencies to facilitate successful criminal prosecutions.

92. (B) World Wide Fund for Nature (WWF)
The Living Planet Report is a landmark scientific publication released biennially by the World Wide Fund for Nature. The report tracks global trends in biodiversity abundance through the Living Planet Index, evaluating human ecological footprint metrics, driver threats, and necessary policy interventions to safeguard planetary health.

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93. (A) To treat and shelter sick or injured wildlife for reintroduction into the wild
The primary objective of a wildlife rehabilitation center is to provide professional medical treatment, nursery care, nutritional therapy, and behavioral rehabilitation to injured, sick, orphaned, or confiscated wild animals. The ultimate goal is restoring their physical health and wild behaviors, facilitating safe reintroduction into native habitats.

94. (C) Allowing the animal to acclimatize in a temporary enclosure before full release
Soft release is a gradual wildlife reintroduction technique where rehabilitated animals are placed in protective temporary enclosures within target habitats prior to full liberation. Providing supplementary food, shelter, and monitoring during this acclimatization phase helps released animals adjust to local environmental conditions, learn foraging, and survive independently.

95. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Hand-rearing orphaned wild mammals requires strictly limiting human contact to prevent behavioral imprinting. When animals become habituated to humans, they lose natural fear instincts, alter wild behavioral patterns, and become unable to forage or defend against predators, severely compromising their long-term survival prospects following release into natural habitats.

116. (C) 2011 - 2020
The Aichi Biodiversity Targets were a set of twenty global conservation goals adopted at the tenth Conference of the Parties to the CBD in Nagoya, Japan. Designed for the Strategic Plan for Biodiversity 2011-2020, these targets guided international efforts to address biodiversity loss drivers and mainstream conservation goals.

117. (B) The Conference of the Parties (COP)
The Conference of the Parties serves as the governing body of the Convention on Biological Diversity. Composed of representatives from all ratified member nations, COP meets periodically to review implementation progress, adopt new policy protocols, set global conservation targets, allocate budgets, and advance global biodiversity governance decisions.

118. (C) 2017 - 2031
India's third National Wildlife Action Plan covers the strategic fifteen-year period from 2017 to 2031. Formulated by the Ministry of Environment, Forest and Climate Change, NWAP-3 sets key national priorities for wildlife conservation, protected area management, landscape connectivity, human-wildlife conflict mitigation, and climate change adaptation strategies across the country.

119. (A) A landscape approach integrating conservation across ecosystems beyond Protected Areas
A key policy shift in the third National Wildlife Action Plan is adopting a landscape-level conservation approach. Recognizing that wild animals move beyond restricted administrative boundaries of national parks and sanctuaries, NWAP-3 emphasizes managing contiguous ecological corridors, human-dominated matrices, and surrounding habitat mosaics to ensure long-term ecosystem integrity effectively.

120. (A) P-4, Q-3, R-2, S-1
Under NWAP-3 strategic priorities, climate change integration involves adapting management plans to shifting vegetation patterns. Poaching control emphasizes intelligence gathering and WCCB enforcement capacity. Human-wildlife conflict mitigation focuses on crop damage compensation and corridor protection. Eco-tourism strategies aim to deliver local community benefits while avoiding ecological disturbances in fragile ecosystems.

121. (A) Climate Change
The third National Wildlife Action Plan (2017-2031) is uniquely recognized as India's first national wildlife policy framework to formally integrate climate change impacts into conservation planning. It prescribes proactive measures to assess ecosystem vulnerability, design climate-resilient habitat corridors, and manage shifting vegetation patterns induced by global warming trends.

122. (D) Securing and restoring traditional wildlife corridors
Under the National Wildlife Action Plan guidelines, securing and restoring habitat corridors is recommended as a vital long-term strategy for human-wildlife conflict mitigation. Establishing continuous movement corridors reduces wildlife stranding in agricultural lands, minimizes crop damage, reduces human casualties, and ensures safe dispersal between fragmented protected forests.

123. (B) Aerial surveillance, anti-poaching patrols, and tracking wildfires
Unmanned Aerial Vehicles, or drones, provide forest managers with powerful aerial surveillance capabilities across dense or inaccessible forest terrains. Forest departments deploy drones for anti-poaching patrols, detecting illegal logging activities, monitoring wildlife movements, mapping forest encroachments, assessing canopy cover changes, and rapidly detecting forest fire outbreaks early.

124. (C) By rapidly processing images to identify species and individual animals
Artificial Intelligence tools, such as pattern-recognition software, enhance wildlife population monitoring by processing millions of camera trap photographs rapidly. AI algorithms sort blank images, classify species accurately, and identify individual animals based on distinct coat markings or rosettes, drastically reducing manual processing time during national censuses.

125. (D) Map forest cover, overlay habitat data, and model wildlife corridors
Geographic Information Systems enable wildlife managers to capture, store, analyze, and visualize spatial environmental data. By overlaying satellite imagery, topography, vegetation cover, human infrastructure, and animal tracking coordinates, GIS models suitable wildlife habitats, identifies

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26. Which structural element within the Uttar Pradesh Forest Department is primarily responsible for the commercial harvesting, marketing, and auctioning of timber and forest produce?
(A) Uttar Pradesh State Biodiversity Conservation Board
(B) Uttar Pradesh Forest Corporation (UPFDC)
(C) Uttar Pradesh Pollution Control Board
(D) Wildlife Crime Control Bureau

27. How does the concept of a 'Value Chain' apply to forest produce such as Mahua or Amla?
(A) It restricts the local consumption of the produce.
(B) It refers to the physical chain used to measure forest boundaries.
(C) Sequential steps from harvest, processing, and packaging to marketing that increase product value
(D) A regulatory mandate requiring that all raw forest produce be sold exclusively to government agencies at fixed rates

28. Which of the following gives the correct sequence of steps in the economic value chain of a Non-Timber Forest Product (NTFP) like honey?
(A) Harvesting → Processing/Refining → Packaging → Marketing
(B) Processing/Refining → Harvesting → Packaging → Marketing
(C) Marketing → Processing/Refining → Harvesting → Packaging
(D) Packaging → Harvesting → Marketing → Processing/Refining

29. The Sustainable Development Goals (SDGs) are closely linked to forest economies. Which SDG specifically aims to "Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss"?
(A) SDG 6
(B) SDG 13
(C) SDG 15
(D) SDG 14

30. Public-Private Partnership (PPP) models in the forest sector are often proposed for which of the following objectives?
(A) To permanently transfer ownership of national parks to private corporations
(B) Reclaiming degraded forest lands through private investment in plantation activities
(C) To allow unregulated private hunting in wildlife sanctuaries
(D) Replacing all native forest species strictly with high-yielding exotic commercial timber plantations

31. Forests play a vital economic role in Disaster Risk Reduction (DRR). Along coastal regions, which forest type is most economically valuable for mitigating the destructive impacts of cyclones and storm surges?
(A) Alpine forests
(B) Tropical dry deciduous forests
(C) Montane subtropical forests
(D) Mangrove forests

32. In the context of Uttar Pradesh's forest revenue, which of the following is generally classified as a Major Forest Produce?
(A) Sal timber
(B) Tendu leaves
(C) Honey and Wax
(D) Medicinal herbs

33. The Clean Development Mechanism (CDM) allows emission-reduction projects in developing countries to earn certified emission reduction (CER) credits. Under which historical international agreement was the CDM defined?
(A) Montreal Protocol
(B) CITES
(C) Kyoto Protocol
(D) Ramsar Convention

34. What is the main economic argument for integrating forests into watershed management projects?
(A) Forests require extensive irrigation, thereby creating jobs for local water carriers.
(B) Blocking regional river flows to enable the creation of large artificial lakes designated exclusively for commercial fishing
(C) Forests allow for the construction of timber-based dams which are superior to concrete dams.
(D) Regulating hydrological cycles to maintain downstream water supply and mitigate flood damage

35. Match the following medicinal plants (List I) with their primary economic or medicinal use (List II):
List I: Medicinal Plant

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135. (A) Government land adjacent to or connecting protected areas
Unlike Community Reserves established on private or community lands, a Conservation Reserve is declared exclusively on government-owned land. Typically situated adjacent to existing National Parks or Wildlife Sanctuaries, Conservation Reserves protect vital buffer zones, landscape corridors, and ecologically sensitive state lands through formal consultation with nearby local village communities.

136. (C) To serve as a buffer zone or corridor protecting adjacent National Parks
The primary ecological function of a Conservation Reserve is serving as a landscape buffer or wildlife corridor adjacent to protected areas. By connecting fragmented forest blocks on government land, Conservation Reserves safeguard movement pathways, reduce edge effects, mitigate human-wildlife conflicts, and enhance ecological connectivity across broad conservation landscapes.

137. (A) The State Board for Wildlife
Under Section 36A of the Wildlife Protection Act, 1972, the State Government must formally consult the State Board for Wildlife before declaring any government-owned land as a Conservation Reserve. This statutory consultation ensures expert evaluation of ecological value, boundary specifications, and local management strategies prior to official gazette notification.

138. (A) I and II only
Conservation Reserves are declared on government-owned lands, whereas Community Reserves are established on private or community lands. Both categories aim to protect landscapes, habitats, and species through participatory management with local populations. Crucially, declaring these reserves does not transfer underlying land titles or ownership rights to the Central Government.

139. (B) Uttarakhand
The Asan Conservation Reserve is located at the confluence of the Yamuna and Asan rivers in the Dehradun district of Uttarakhand. In 2020, it became the first wetland in Uttarakhand to be designated as a Ramsar Site of International Importance, serving as a critical migratory waterfowl habitat.

140. (C) No, rights of residents inside a Conservation Reserve are unaffected
Declaring a Conservation Reserve on government land does not alter or restrict the existing land, customary, or socio-economic rights of local residents living within or near the area. Local communities retain traditional resource uses, rights of way, and agricultural activities, subject to management plans agreed with conservation authorities.

141. (D) Swamp Deer
The Swamp Deer, locally known as Barasingha, is the official State Animal of Uttar Pradesh. Inhabiting marshy grasslands and riverine floodplains, major populations survive in the Terai region within Dudhwa National Park and surrounding sanctuaries, representing a key focal species for wetland ecosystem conservation in the state.

142. (A) State Bird
The Sarus Crane is recognized as the official State Bird of Uttar Pradesh. Standing as the world's tallest flying bird, it is celebrated for lifetime pair bonding and holds significant cultural value. Uttar Pradesh supports the largest population of Sarus Cranes in India, inhabiting agricultural wetlands and rural floodplains.

143. (B) Ashoka (Saraca asoca)
The Ashoka tree is designated as the official State Tree of Uttar Pradesh. Revering deep historical, cultural, and medicinal significance across Indian tradition, this evergreen rainforest tree features fragrant orange-red flowers and dense glossy foliage, symbolizing ecological heritage and rich traditional medicine systems throughout the state of Uttar Pradesh.

144. (B) Palash
Palash, scientifically known as Butea monosperma and commonly called Flame of the Forest, is the official State Flower of Uttar Pradesh. Renowned for its vibrant orange-scarlet spring blossoms, the tree holds cultural value, yields natural dyes, improves soil quality through nitrogen fixation, and thrives across dry deciduous tracts.

145. (B) I, II and III only
Dudhwa, Pilibhit, and Amangarh Tiger Reserves are located along northern Uttar Pradesh, forming integral components of the Terai Arc Landscape. This transboundary ecological

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(D) Assertion (A) is false but Reason (R) is true.

9. Non-Timber Forest Products (NTFPs) play a crucial role in the rural economy. The resin (Lisa) tapped from pine trees is primarily used as a raw material in which of the following industries?
(A) Paper and pulp manufacturing industry
(B) Beedi rolling and processing industry
(C) Turpentine and rosin industry
(D) Tanning and leather manufacturing

10. The Government of India introduced the Minimum Support Price (MSP) scheme for Minor Forest Produce (MFP). Which nodal agency at the national level is responsible for implementing this scheme?
(A) TRIFED
(B) NITI Aayog
(C) NABARD
(D) Indian Council of Forestry Research and Education (ICFRE)

11. Which of the following forest products is extracted from the heartwood of the Khair tree (Acacia catechu) and has significant commercial value in the pan masala and medicinal industries?
(A) Lac
(B) Tannin
(C) Gum Karaya
(D) Katha

12. Consider the following statements regarding the Pradhan Mantri Van Dhan Yojana:
I. It aims to improve the livelihood of tribal populations by promoting value addition to Minor Forest Produce.
II. Under this scheme, Van Dhan Vikas Kendras (VDVKs) are established at the grassroots level.
III. The scheme is entirely funded and implemented by the Ministry of Environment, Forest and Climate Change.
Which of the statement(s) given above is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

13. How do forests predominantly support the hydropower sector economically?
(A) By directly providing sustainable biomass fuel for thermal power plants operating near dams
(B) By significantly increasing dissolved minerals in river water to boost hydro turbine output
(C) By reducing soil erosion to prevent reservoir siltation and prolong dam operational lifespan
(D) By accelerating the seasonal flow rate of surface runoff during heavy monsoon rainfall events

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14. Which of the following is considered an indirect ecosystem service of forests rather than a direct provisioning service?
(A) Timber extraction
(B) Collection of medicinal plants
(C) Harvesting of wild edible mushrooms
(D) Carbon sequestration

15. The 'Contingent Valuation Method' used in environmental economics assesses the value of an ecosystem by determining:
(A) Individual willingness to pay (WTP) for environmental conservation
(B) The total financial expenditure incurred by visitors to travel to the natural ecosystem
(C) The current market price of commercial timber available within the targeted ecosystem
(D) The estimated replacement cost of the ecosystem using artificial engineering infrastructure

16. Eco-tourism generates significant revenue. In Uttar Pradesh, which of the following models is most commonly adopted to ensure that local communities economically benefit from eco-tourism?
(A) Complete privatization of national parks
(B) Formation of Eco-Development Committees (EDCs) that share a percentage of tourism revenue
(C) Allowing local residents to commercially hunt within protected areas throughout the tourist season
(D) Transferring all forest land titles to private hoteliers

17. The sports goods industry, particularly cricket bat manufacturing, relies on specific wood types. Which tree provides the standard wood used for high-quality cricket bats?
(A) Sal
(B) Willow
(C) Teak
(D) Mahogany

Fund, enabling the State Forest Department to execute afforestation activities.

156. (C) Ministry of Environment, Forest and Climate Change
The National Afforestation and Eco-Development Board operates directly within the Ministry of Environment, Forest and Climate Change. Established in 1992, NAEB promotes ecological restoration, afforestation, and eco-development activities across degraded forest lands, wasteland regions, and eco-sensitive areas through participatory community-based forest management programs nationwide.

157. (D) Infectious diseases naturally transmissible between animals and humans
Zoonotic diseases are infectious illnesses caused by pathogenic micro-organisms, including viruses, bacteria, fungi, or parasites, that naturally jump between vertebrate animals and humans. In wildlife management, tracking zoonotic pathogens is critical to preventing disease transmission between wild species, domestic livestock, and human populations living near forest interfaces.

158. (A) Tigers and lions
Canine Distemper Virus, a contagious viral pathogen common in domestic dogs, has emerged as a severe threat to wild carnivore conservation in India. Outbreaks of CDV have caused fatal encephalopathy and respiratory disease in endangered Asiatic lions in Gir and Royal Bengal tigers in several tiger reserves.

159. (B) Ingestion or inhalation of spores from contaminated soil or water
Anthrax is a severe bacterial disease caused by Bacillus anthracis that infects wild herbivores and Asian elephants. The bacterium forms highly resilient spores that persist in soil for decades. Animals contract anthrax through ingesting or inhaling these environmental spores while grazing on contaminated vegetation or drinking at drying waterholes.

160. (A) P-3, Q-1, R-4, S-2
Kyasanur Forest Disease is a tick-borne viral haemorrhagic fever affecting wild primates and humans. Avian Influenza predominantly infects wild migratory and domestic waterbirds. Foot and Mouth Disease is a highly contagious viral illness spread from livestock to wild herbivores. Elephant Endotheliotropic Herpesvirus causes fatal haemorrhagic disease in young Asian elephants.

161. (A) Interconnected human, animal, and ecosystem health
The One Health approach is a collaborative, cross-disciplinary framework recognizing that human health, domestic and wild animal health, and ecosystem integrity are inextricably linked. Integrating wildlife disease surveillance, veterinary medicine, environmental management, and public health enables early detection and prevention of emerging zoonotic disease spillovers at human-animal interfaces.

162. (C) It facilitates disease spillover like Foot and Mouth Disease to wild populations
Livestock grazing on the fringes of protected areas poses a severe biological threat to wild herbivores like Gaur and Spotted Deer through infectious disease transmission. Unvaccinated cattle carrying contagious pathogens, such as Foot and Mouth Disease, Anthrax, or Rinderpest, transmit infections to wild ungulate populations sharing shared grazing pastures.

163. (D) Educate visitors on local biodiversity and conservation through exhibits
Nature Interpretation Centres established at protected area entry gates serve as vital educational hubs for park visitors. Through interactive displays, audio-visual exhibits, scale models, and guided orientation programs, these centers effectively raise public awareness regarding local wildlife biodiversity, complex ecological food webs, conservation challenges, and responsible eco-tourism practices.

164. (B) 2nd to 8th October
Wildlife Week is observed annually across India from October 2nd to October 8th, coinciding with the birth anniversary of Mahatma Gandhi. Organized by forest departments, educational institutions, and conservation bodies, the week features awareness campaigns, symposia, field walks, and youth competitions to promote wildlife preservation nationwide.

165. (B) Needs Assessment - Audience Identification - Message Design & Implementation - Evaluation
A structured community conservation awareness campaign follows a logical project design sequence. It begins with assessing local conservation needs,

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key movement corridors, and supports spatial decision-making for protected area planning.

126. (A) Detect heat signatures of poachers and animals in darkness or fog
Thermal e-surveillance systems installed on high-altitude towers in national parks like Kaziranga and Dudhwa use thermal imaging sensors to detect thermal infrared heat signatures emitted by humans and animals. This technology provides continuous day and night monitoring, penetrating darkness, dense foliage, and fog to alert guards to unauthorized entries.

127. (B) To individually identify rescued or legally owned captive wildlife
RFID microchips are small transponders implanted beneath the skin of captive or rescued animals to provide permanent, tamper-proof individual identification. Forest authorities and zoo managers use RFID readers to verify legal ownership records, track captive breeding lineages, manage rescue center stock, and prevent illegal wild animal substitution in trade.

128. (B) Gunshots or chainsaws from illegal logging
Acoustic monitoring networks deployed in forest canopies continuously record environmental soundscapes. Programmed with automated audio-detection algorithms, these devices identify specific illegal disturbance sounds, such as gunshots, chainsaw motors, or vehicle engine noise, instantly transmitting real-time geographic alerts to forest guard stations for immediate law enforcement response.

129. (C) 2002
The legal designation of Community Reserve was introduced into Indian law through the Wildlife Protection Amendment Act, 2002. This amendment created formal legal provisions allowing state governments to recognize community-driven conservation efforts on private or community lands, providing legal protection without altering underlying land ownership rights.

130. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Community Reserves under the Wildlife Protection Act are declared specifically on private or community-owned lands where local individuals or communities voluntarily conserve flora and fauna. This legal framework formally recognizes, supports, and legally protects community conservation initiatives while preserving traditional land ownership and socio-economic rights of local landholders.

131. (D) A nominee of the local community or Village Panchayat
The Community Reserve Management Committee is responsible for conserving and managing a notified Community Reserve. Under the Wildlife Protection Act, 1972, this committee is headed by a representative nominated directly by the local community or Gram Panchayat, ensuring genuine local leadership and participatory community management in administrative conservation decisions.

132. (C) Areas comprised within a National Park or a Sanctuary
Statutory provisions governing the declaration of Community Reserves explicitly exclude lands already situated within existing National Parks or Wildlife Sanctuaries. Because government-owned protected areas fall under strict statutory protection regimes, Community Reserves apply exclusively to private, non-forest, or community lands outside government protected area networks.

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133. (B) Hunting of wild animals is prohibited, as in a National Park or Sanctuary
Upon notification of an area as a Community Reserve, statutory provisions of the Wildlife Protection Act apply, prohibiting hunting and wild animal destruction within its designated boundaries. The management committee enforces wildlife protection regulations identical to those in Sanctuaries, safeguarding resident species while accommodating traditional non-destructive land uses.

134. (D) The State Government, after consulting the local community or landowner
Under Section 36C of the Wildlife Protection Act, 1972, the State Government holds the legal authority to notify any community or private land as a Community Reserve. Such notification requires prior consultation with local community members, landholding individuals, or Gram Panchayats who voluntarily agree to conserve local biological diversity.

CHAPTER 13
Contribution of Forests to the Indian Economy

1. The concept of Green GDP differs from conventional Gross Domestic Product (GDP) primarily by accounting for which of the following?
(A) The total financial market value of all agricultural and allied products
(B) The economic cost of environmental degradation and resource depletion
(C) The gross revenue generated exclusively by the forestry and wildlife sector
(D) The total value of all renewable energy produced within a financial year

2. Which ecosystem service valuation method is most commonly used to estimate the economic value of recreational benefits provided by a forest or national park?
(A) Travel Cost Method
(B) Hedonic Pricing Method
(C) Replacement Cost Method
(D) Market Price Method

3. In the context of India's Gross Domestic Product (GDP), the forestry and logging sector is classified under which of the following broad economic sectors?
(A) Primary Sector
(B) Secondary Sector
(C) Tertiary Sector
(D) Quaternary Sector

4. Which of the following best describes the indirect economic contribution of forests to agricultural productivity?
(A) Supplying chemical fertilizers to agricultural lands
(B) Providing high-yielding variety seeds for staple crops
(C) Directly increasing the Minimum Support Price of agricultural commodities
(D) Enhancing soil moisture conservation and preventing soil erosion

5. The Indian paper and pulp industry relies heavily on forest-based raw materials. Which of the following grass species is historically highly valued as a raw material for paper manufacturing in Uttar Pradesh?
(A) Giant elephant grass
(B) Commercial lemongrass
(C) Sabai grass (Bhabar)
(D) Vetiver grass (Khus)

6. Which district in Uttar Pradesh is historically renowned as a major hub for the wood carving and wooden handicraft industry, significantly contributing to the state's forest-based economy?
(A) Kanpur
(B) Saharanpur
(C) Aligarh
(D) Moradabad

7. The matchbox industry in India utilizes specific lightweight woods. Which of the following tree species is predominantly used for making match splints?
(A) Teak (Tectona grandis)
(B) Sal (Shorea robusta)
(C) Shisham (Dalbergia sissoo)
(D) Semal (Bombax ceiba)

8. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): The direct contribution of the forestry sector to India's GDP often appears relatively small compared to other sectors.
Reason (R): Many of the non-timber forest products (NTFPs) and ecosystem services provided by forests are unpriced and traded in informal markets.
Which of the following is correct?
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.

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followed by identifying specific target audiences. Next, custom educational messages are designed and implemented across chosen media, concluding with systematic project evaluation to measure changes in community knowledge and behaviors.

166. (D) Charismatic symbols that rally public support and funding to protect entire ecosystems
A flagship species is a charismatic animal, such as the Tiger or Asian Elephant, chosen to serve as an ambassador symbol for conservation campaigns. By capturing public imagination, driving media attention, and mobilizing financial resources, flagship species generate widespread support that indirectly protects extensive habitats and co-occurring biological communities.

167. (A) Kuno National Park, Madhya Pradesh
Under Project Cheetah, India's ambitious intercontinental species translocation initiative, wild African cheetahs were translocated from Namibia and South Africa to Kuno National Park in Madhya Pradesh. This reintroduction project aims to restore natural grassland ecosystems, rebuild predator-prey dynamics, and establish a free-ranging wild cheetah population within historical ranges.

168. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
The Government of India introduced the MISHTI scheme in the 2023 Union Budget to promote mangrove plantation along coastline and salt pan lands. Mangrove forests serve as critical bio-shields mitigating coastal erosion and storm surges, while sequestering vast quantities of atmospheric blue carbon within rich estuarine sediments.

169. (A) Ramsar wetlands
The Amrit Dharohar scheme was launched by the Union Government to promote conservation, wise use, and eco-tourism across India's Ramsar sites over a three-year period. The initiative aims to enhance wetland biodiversity, support local community livelihoods, encourage carbon sequestration, and preserve pristine aquatic ecosystems effectively through active local community participation.

170. (A) I and II only
The Forest Conservation Amendment Act, 2023 exempts specific strategic linear projects situated within 100 kilometers of international borders from mandatory central clearances. Additionally, it explicitly classifies silvicultural activities, zoos, safari parks, and eco-tourism facilities as forestry-related operations, while retaining Central Government approval requirements for mining on forest lands.

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18. Match the following forest products (List I) with their primarily associated tree or plant species (List II):

List I: Product

P. Tendu leaves
Q. Lac
R. Resin
S. Katha

List II: Species

1. Khair
2. Chir Pine
3. Palash / Kusum
4. Diospyros melanoxylon

Which of the following is the correct matching?
(A) P-4, Q-3, R-2, S-1
(B) P-3, Q-4, R-1, S-2
(C) P-4, Q-1, R-2, S-3
(D) P-2, Q-3, R-4, S-1

19. Tendu leaves are fundamental to the bidi-making cottage industry. In Uttar Pradesh, the collection of Tendu leaves is largely concentrated in which geographic region?
(A) Terai and Bhabar foothill region
(B) Western Doab agricultural region
(C) Bundelkhand and Vindhyan region
(D) Ruhelkhand alluvial belt region

20. Which central scheme links rural employment generation with afforestation, soil conservation, and water harvesting on a massive scale?
(A) Pradhan Mantri Fasal Bima Yojana for agricultural crop insurance coverage
(B) PM-KISAN
(C) Stand-Up India
(D) MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act)

21. Which of the following represents a significant current trend in India's forest-based foreign trade?
(A) India functions as a major net exporter of raw industrial roundwood to international markets.
(B) India strictly prohibits the export of all Non-Timber Forest Products.
(C) Net importer of timber and industrial wood owing to domestic conservation policies
(D) India relies entirely on domestic production for all its paper and pulp needs.

22. Bamboo is often referred to as 'Green Gold' in India. Which amendment significantly boosted bamboo cultivation on private lands by removing non-forest grown bamboo from the definition of a 'tree'?
(A) Wildlife (Protection) Amendment Act, 2002
(B) Indian Forest (Amendment) Act, 2017
(C) Forest (Conservation) Amendment Act, 1988
(D) Biological Diversity Act, 2002

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23. What is the primary purpose of the Compensatory Afforestation Fund Management and Planning Authority (CAMPA)?
(A) Providing subsidized micro-loans for establishing rural forest-based cottage industries
(B) Managing funds from diverted forest lands to execute compensatory afforestation
(C) To distribute timber extraction quotas to private logging companies
(D) To regulate the international export of medicinal plants

24. Consider the following statements regarding Carbon Credit trading in the forest sector:
I. A carbon credit represents one metric ton of carbon dioxide equivalent removed from the atmosphere.
II. REDD+ is an international framework that provides financial incentives to developing countries for maintaining and enhancing forest carbon stocks.
III. India does not participate in any form of voluntary carbon markets.
IV. Afforestation and reforestation projects can generate carbon credits.
Which of the statement(s) given above is/are correct?
(A) I, II, and III only
(B) II, III, and IV only
(C) I, II, and IV only
(D) I, III, and IV only

25. Which of the following is the most significant economic consequence of forest area degradation?
(A) Immediate long-term increase in agricultural crop yields resulting from expanded arable land areas
(B) Reduced ecosystem services increasing water purification and flood control costs
(C) Permanent enhancement of local eco-tourism potential
(D) Decrease in the administrative costs of the state forest department

landscape along the Himalayan foothills supports high tiger densities. In contrast, Ranipur Tiger Reserve is situated in the southern Bundelkhand region, outside the Terai Arc network.

146. (C) Chandra Shekhar Azad
The Nawabganj Bird Sanctuary, located in Unnao district, Uttar Pradesh, was officially renamed the Shahid Chandra Shekhar Azad Bird Sanctuary in 2015. This prominent wetland sanctuary along the Kanpur-Lucknow highway protects dense populations of resident waterbirds and migratory waterfowl resting along the Central Asian Flyway during winter months.

147. (D) Hardoi
Sandi Bird Sanctuary is located in the Hardoi district of Uttar Pradesh. Created in 1990 to preserve natural freshwater wetlands along the Garra river basin, it serves as a critical wintering ground for thousands of migratory waterfowl, earning recognition as an internationally designated Ramsar Site of ecological importance.

148. (C) Agra
Sur Sarovar, commonly known as Keetham Lake, is a man-made wetland situated in the Agra district of Uttar Pradesh. Designated as a Ramsar Site in 2020, this sanctuary protects over a hundred migratory and resident bird species, while hosting a dedicated bear rescue center for rehabilitated sloth bears.

149. (B) Etawah
The Uttar Pradesh government established the Lion Safari Park in the Etawah district within the Fisher Forest area. Created for ex-situ conservation, wildlife tourism, and public education, this specialized facility houses Asiatic lions within large semi-captive enclosures, featuring dedicated breeding facilities and modern wildlife veterinary care infrastructure.

150. (D) I, II, III and IV
All four listed wetlands are designated Ramsar Sites of International Importance located within Uttar Pradesh. Upper Ganga River, Samaspur Bird Sanctuary in Raebareli, Parvati Arga Bird Sanctuary in Gonda, and Sarsai Nawar Jheel in Etawah provide vital winter habitats for migratory birds and perform crucial hydrological regulation functions.

151. (A) Compensatory Afforestation Fund Management and Planning Authority
CAMPA stands for Compensatory Afforestation Fund Management and Planning Authority. Established following Supreme Court orders and formalized under the Compensatory Afforestation Fund Act, 2016, CAMPA manages funds collected from user agencies diverting forest land, directing financial resources toward compensatory afforestation, catchment area treatment, and wildlife habitat restoration.

152. (C) NPV and compensatory afforestation charges paid for diverting forest land
CAMPA funds are generated from mandatory financial payments made by project developers diverting forest land for non-forest industrial or infrastructure projects. These statutory charges include Net Present Value of diverted forests, compensatory afforestation costs, catchment area treatment funds, and specific environmental mitigation levies mandated under forest clearance conditions.

153. (A) Global environmental issues including biodiversity loss and climate change
The Global Environment Facility is an international financial mechanism established during the 1992 Rio Earth Summit. GEF provides grant funding to developing nations to address pressing environmental challenges, including biodiversity loss, climate change mitigation, land degradation, international waters protection, and hazardous chemicals management, serving multiple global environmental conventions.

154. (B) 50% Central, 50% State
Under the Centrally Sponsored Scheme of Project Tiger, financial assistance for recurring operational expenditure in non-hilly states like Uttar Pradesh is shared on a 50:50 ratio between the Central Government and State Governments. For non-recurring capital investments, the Central Government provides 60% funding, while States contribute 40%.

155. (A) II, III, I, IV
The legal process for CAMPA funding begins when the Central Government approves forest land diversion. Next, the user agency deposits NPV and compensatory levies into the National CAMPA Fund. The Central Authority then transfers funds to the respective State CAMPA

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P. Rauvolfia serpentina (Sarpagandha)
Q. Taxus wallichiana (Himalayan Yew)
R. Azadirachta indica (Neem)
S. Emblica officinalis (Amla)

List II: Primary Economic/Medicinal Use

1. Source of Vitamin C and immunity boosters
2. Treatment of hypertension/high blood pressure
3. Anti-cancer drug (Taxol) production
4. Biopesticide and antibacterial products

Which of the following is the correct matching?
(A) P-2, Q-3, R-4, S-1
(B) P-3, Q-2, R-1, S-4
(C) P-4, Q-1, R-2, S-3
(D) P-2, Q-4, R-3, S-1

36. Which institutional body at the village level is legally empowered under the Forest Rights Act (FRA), 2006 to govern, manage, and economically benefit from community forest resources?
(A) Zila Parishad
(B) Gram Sabha
(C) Forest Department Range Office
(D) Block Development Office

37. The economic valuation of forests often divides values into Use Values and Non-Use Values. Which of the following is an example of a Non-Use Value (Existence Value)?
(A) Direct commercial revenue collected from harvesting and selling diverse non-timber forest products in regional markets
(B) Satisfaction derived from knowing a pristine natural reserve exists without visiting it
(C) Income generated from safari jeep operators
(D) Cost savings from flood protection

38. Consider the following statements regarding the role of the Indian Forest Service (IFS) in economic management:
I. IFS officers are responsible for preparing Working Plans that regulate the sustainable harvest of timber.
II. They ensure the collection and remittance of forest revenue to the state exchequer.
III. They have the authority to alter the Minimum Support Price of agricultural crops outside forest areas.
Which of the statement(s) given above is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

39. Which traditional cottage industry in Uttar Pradesh is highly dependent on cane and bamboo resources, significantly centered around the Bareilly district?
(A) Zari-Zardozi embroidery work
(B) Glass bangles
(C) Cane furniture and Surma
(D) Brassware

40. The 'Joint Forest Management' (JFM) concept was institutionalized in India to achieve which primary economic outcome?
(A) Jointly sharing forest protection duties and economic benefits between authorities and communities
(B) Exchanging forest land for foreign debt relief
(C) Transferring all forest rights exclusively to multi-national corporations
(D) Centralizing all forest produce revenues strictly under the administrative control of the Union Government

41. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): Cultivation of medicinal and aromatic plants provides higher economic returns per hectare compared to traditional cereal crops in suitable agro-climatic zones.
Reason (R): The global and domestic pharmaceutical and cosmetic industries have a steadily increasing demand for natural raw materials.
Which of the following is correct?
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

42. Plywood and veneer industries require large girth timber logs. Due to the scarcity of such logs in natural forests, these industries now primarily source their raw material from:
(A) Deep core areas of National Parks
(B) Illegally felled mangrove forests
(C) High-altitude alpine pasture ecosystems located across the Himalayan mountain ranges
(D) Trees Outside Forests (TOF) and agroforestry plantations

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economic trade of endangered wild flora and fauna?
(A) UNFCCC (United Nations Framework Convention on Climate Change)
(B) UNCLOS (United Nations Convention on the Law of the Sea)
(C) CITES (Convention on International Trade in Endangered Species)
(D) Basel Convention on the Control of Transboundary Movements of Hazardous Wastes

78. Which of the following represents an indirect contribution of forests to the pharmaceutical industry?
(A) Providing land for building large manufacturing plants
(B) Serving as a gene pool for discovering active drug compounds
(C) Supplying glass bottles for medicinal syrups
(D) Generating renewable hydroelectric power dedicated to operating pharmaceutical factories

79. The development of 'Sacred Groves' by local communities represents an intersection of cultural beliefs and conservation. What is the primary economic implication of Sacred Groves in modern times?
(A) They are heavily logged for commercial timber.
(B) Preserving local biodiversity vital for agriculture and traditional medicine
(C) They are legally auctioned and exclusively sold to private real estate developers for commercial projects
(D) They require massive government funding for daily maintenance.

80. Identify the incorrect statement regarding the Uttar Pradesh Forest Corporation (UPFDC):
(A) It was established under the UP Forest Corporation Act, 1974.
(B) It solely focuses on the conservation of tigers without any commercial activities.
(C) One of its primary roles is the scientific extraction, transport, and sale of forest produce.
(D) It undertakes the management of eco-tourism destinations in the state.

81. In economic terms, what is the 'Opportunity Cost' of conserving a piece of forest land as a protected wildlife sanctuary?
(A) The total annual revenues derived from entry fees collected from foreign and domestic tourists visiting the sanctuary
(B) The financial cost of hiring forest guards
(C) Foregone economic benefits from alternative land uses like agriculture or mining
(D) The value of the carbon sequestered by the trees

82. Which of the following tree species is considered the most economically important timber species in the moist deciduous forests of Uttar Pradesh, particularly in the Terai region?
(A) Sandalwood (Santalum album)
(B) Sal (Shorea robusta)
(C) Pine (Pinus roxburghii)
(D) Deodar (Cedrus deodara)

83. Consider the following stages in the paper industry value chain:
I. Pulping of wood/grass
II. Felling and debarking of trees
III. Paper making and rolling
IV. Transportation of raw logs to the mill
Which of the following represents the correct logical sequence of these stages?
(A) II, IV, I, III
(B) IV, II, I, III
(C) II, I, IV, III
(D) I, II, III, IV

84. Consider the following statements regarding the economic prospects of Public-Private Partnership (PPP) models in forestry:
I. They can mobilize private capital for the afforestation of degraded lands.
II. They ensure specialized technical expertise in establishing high-yield plantations.
III. A major challenge is balancing the commercial interests of private entities with the livelihood rights of local communities.
IV. PPP models guarantee zero ecological impact on natural forests.
Which of the statement(s) given above is/are correct?
(A) I, II, and IV only
(B) II, III, and IV only
(C) I, II, and III only
(D) I, III, and IV only

85. 'Agroforestry' systems are heavily promoted in agricultural plains like Western Uttar Pradesh. What is the primary economic benefit of agroforestry to a farmer?

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52. Which tree species, widely grown in Uttar Pradesh under agroforestry systems, provides the principal raw material for the safety match and plywood industries due to its fast growth?
(A) Sandalwood (Santalum album)
(B) Poplar (Populus deltoides)
(C) Banyan (Ficus benghalensis)
(D) Sal (Shorea robusta)

53. The 'Shadow Pricing' technique is used in the forest economic sector to:
(A) Determine the exact black-market price of smuggled timber
(B) Valuing unpriced or underpriced forest goods and ecosystem services
(C) Calculating the shadow cast by dense tree canopies to estimate overall timber standing volume
(D) Hide the true profits of forest corporations from tax authorities

54. Which of the following best describes 'Ecosystem Accounting' as proposed by international frameworks like SEEA (System of Environmental-Economic Accounting)?
(A) Comprehensive registry maintenance of all wild animal species housed within municipal zoos
(B) Integrating ecosystem physical and economic values into national accounts
(C) Tracking the daily cash expenditures of a forest ranger
(D) Accounting for the financial losses of timber smugglers

55. Match the following institutions related to the forest economy (List I) with their primary function or association (List II):
List I: Institution
P. TRIFED
Q. UPFDC
R. CAMPA
S. ICFRE
List II: Primary Function / Association
1. Forestry research and education
2. Compensatory afforestation fund management
3. Tribal cooperative marketing of forest produce
4. Commercial harvesting and sale of forest produce in UP
Which of the following is the correct matching?
(A) P-3, Q-4, R-2, S-1
(B) P-4, Q-3, R-1, S-2
(C) P-3, Q-2, R-4, S-1
(D) P-1, Q-4, R-2, S-3

56. Consider the following statements regarding Eco-tourism business models:
I. In the Build-Operate-Transfer (BOT) model, private players develop infrastructure and eventually transfer it back to the government.
II. Revenue sharing models ensure that a portion of the gate receipts is directed to local community funds.
III. Ecotourism strictly prohibits any form of financial transaction within protected areas.
IV. Homestays in forest fringe villages form a key part of decentralized eco-tourism.
Which of the statement(s) given above is/are correct?
(A) I, II, and III only
(B) I, II, and IV only
(C) II, III, and IV only
(D) I, III, and IV only

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57. The collection and sale of Sal seeds is an important economic activity in certain regions. What is the primary commercial use of Sal seed fat?
(A) Commercial manufacturing of specialized synthetic industrial rubber products
(B) Serving as a Cocoa Butter Equivalent in cosmetics and chocolate making
(C) Producing high-octane aviation fuel
(D) Manufacturing of matches

58. The Indian government permits the export of which of the following forest products without any quantitative restrictions, owing to its value-added nature?
(A) Sandalwood logs
(B) Unprocessed raw Red Sanders timber harvested from forests
(C) Finished wooden handicrafts and furniture
(D) Unprocessed wild orchids

59. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): Incorporating Green GDP into national economic planning provides a more accurate picture of a country's long-term sustainable growth.
Reason (R): Conventional GDP does not subtract the costs associated with the depletion of natural capital such as forests and clean water.
Which of the following is correct?

(A) Increasing the purity of water, thus reducing filtration costs
(B) Reducing reservoir storage capacity, lowering power generation and irrigation
(C) Increasing the lifespan of the turbine blades
(D) Making downstream water significantly denser, thereby generating far more electricity per liter discharged

94. Consider the following statements regarding the economic importance of mangroves:
I. They act as nurseries for commercially important marine fish and prawns.
II. They provide valuable timber and fuel wood to coastal communities.
III. They increase the vulnerability of coastal infrastructure to tidal waves.
Which of the statement(s) given above is/are correct?
(A) I only
(B) I and II only
(C) II and III only
(D) I, II, and III

95. The 'Mahua' tree (Madhuca longifolia) is of immense economic importance to tribal economies in Central India and parts of UP. Which part of the tree is traditionally collected on a large scale for producing country liquor and edible products?
(A) Bark
(B) Roots
(C) Flowers
(D) Leaves

96. Which of the following is an example of an 'Option Value' in the economic valuation of forest ecosystems?
(A) The current revenue from timber sales
(B) Value of preserving forest genetic resources for potential future medical cures
(C) The immediate aesthetic pleasure and psychological well-being derived from viewing a pristine forest landscape
(D) The profit generated by a paper mill this financial year

97. The concept of Sustainable Development Goals (SDGs) focuses on balanced economic growth. Which of the following SDGs is directly aimed at ending poverty, a goal strongly supported by the forest-based rural economy?
(A) SDG 1
(B) SDG 4
(C) SDG 7
(D) SDG 16

98. In Uttar Pradesh, the Terai Arc Landscape is critical for ecotourism. This landscape primarily stretches along the border of UP and which neighboring country?
(A) Bhutan
(B) Nepal
(C) Bangladesh
(D) China

99. Which of the following best describes the economic role of a 'Van Samiti' (Forest Committee) formed under the Joint Forest Management (JFM) guidelines?
(A) To auction national parks to foreign tourists
(B) Distributing forest harvest revenues equitably among local villagers
(C) To collect income tax from forest officials
(D) To strictly enforce statutory provisions under the Wildlife Protection Act and directly issue shoot-on-sight orders

100. The commercial extraction of 'Resin' from pine trees is a labor-intensive process. What is the standard scientific method promoted by forest departments to ensure the long-term economic yield of resin without killing the tree?
(A) Deep axe-cut method
(B) Rill method
(C) Root extraction method
(D) Clear-felling method

101. Which organization works under the Ministry of Tribal Affairs to ensure remunerative prices for forest produce gathered by tribes, directly impacting their economic status?
(A) FSSAI
(B) TRIFED
(C) NABARD
(D) APEDA

102. The financial framework that compensates developing countries for 'Reducing Emissions from Deforestation and forest Degradation' is known as:
(A) UNEP
(B) REDD+
(C) CITES
(D) IUCN

103. The 'Hedonic Pricing Method' evaluates the economic value of a forest by observing:
(A) Real estate price differentials based on

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(C) II, III, I
(D) III, II, I

69. Uttar Pradesh has a significant potential for eco-tourism. Which of the following wildlife reserves is NOT situated in Uttar Pradesh?
(A) Dudhwa National Park
(B) Pilibhit Tiger Reserve
(C) Katarniaghat Wildlife Sanctuary
(D) Bandhavgarh National Park

70. Bhabar grass, predominantly found in the Shivalik foothills and Terai regions, is economically critical for which traditional industry?
(A) Rope and paper manufacturing
(B) Essential oil extraction and refining
(C) Beedi wrapping
(D) Silk production

71. The 'Multiplier Effect' in the context of the forest-based rural economy refers to:
(A) The rapid biological reproduction of invasive tree species
(B) Income injections generating expanded local consumption and secondary economic activity
(C) The mathematical process of multiplying tree height by girth measurements to estimate timber volume
(D) The exponential increase in forest fires during summer

72. Which of the following is considered a negative economic externality of large-scale monoculture plantations (like Eucalyptus) in water-scarce regions?
(A) Rapid generation of pulpwood
(B) Lowering groundwater tables, impacting nearby crop yields
(C) Substantially increased commercial availability of uniform industrial timber logs
(D) High rate of carbon sequestration

73. Consider the following statements about carbon sequestration:
I. Forests act as a carbon sink by absorbing atmospheric carbon dioxide during photosynthesis.
II. Trading carbon credits provides a financial incentive for forest conservation.
III. Old-growth, mature forests store massive amounts of carbon but their rate of active carbon sequestration is often slower than young, rapidly growing plantations.
Which of the statement(s) given above is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

74. Which of the following most accurately defines the term 'Stumpage Value' in forest economics?
(A) The direct financial cost associated with removing deep tree stumps after timber felling operations
(B) Value of a standing tree prior to felling, paid for harvesting rights
(C) The penalty imposed for illegal felling of trees
(D) The cost of planting a new sapling

75. A key objective of the National Bamboo Mission is to promote the bamboo sector through a cluster-based approach. Which of the following is an economic benefit of this approach?
(A) It isolates individual artisans, reducing competition
(B) Integrating cultivation, processing, and marketing to achieve economies of scale
(C) It forces artisans to rely strictly on imported bamboo
(D) It legally limits the primary application of harvested bamboo purely to agricultural boundary fencing

76. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): The forestry sector has immense potential for poverty alleviation in rural India.
Reason (R): Forest-based activities are generally labor-intensive and require relatively low capital investment, making them accessible to marginalized communities.
Which of the following is correct?
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

77. The trade of highly valuable timber species like Red Sanders is strictly regulated globally to prevent over-exploitation. Which international treaty primarily regulates the cross-border

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112. The concept of 'Carrying Capacity' in forestry management is most directly related to which economic goal?
(A) Maximizing short-term timber profits
(B) Keeping timber harvest rates within natural regeneration capacity
(C) Accommodating the maximum number of livestock for grazing regardless of grass availability
(D) Planning and constructing the maximum possible number of concrete transportation roads inside a reserved forest

113. Under the Forest Rights Act (FRA) 2006, the recognition of 'Community Forest Resource' rights legally enables local communities to:
(A) Sell the forest land to foreign real estate investors
(B) Conserve community forest resources for sustainable use
(C) Establish major high-emission heavy manufacturing industries directly inside core protected forest areas
(D) Deny entry to all government officials permanently

114. Which economic model best describes the functioning of the 'Van Dhan Vikas Kendras' (VDVKs)?
(A) A purely capitalist monopoly model
(B) Cooperative model where tribal gatherers pool and market produce
(C) A feudal model where a landlord dictates prices
(D) A rigid, highly centralized public sector administration model managed strictly by senior executive officers

115. Match the following concepts of Ecosystem Valuation (List I) with their corresponding definitions (List II):

List I: Concept
P. Direct Use Value
Q. Indirect Use Value
R. Bequest Value
S. Existence Value

List II: Definition
1. Value of knowing the ecosystem will be preserved for future generations
2. Value of regulating services like climate control and water purification
3. Value from actual consumption or physical interaction (e.g., timber, recreation)
4. Value from merely knowing the ecosystem exists, without planning to use it

Which of the following is the correct matching?
(A) P-3, Q-2, R-1, S-4
(B) P-2, Q-3, R-4, S-1
(C) P-3, Q-1, R-2, S-4
(D) P-1, Q-2, R-3, S-4

116. Which of the following is NOT an objective of integrating the forestry sector with the MGNREGA scheme?
(A) Creating long-term durable community assets such as water ponds and tree plantations
(B) Generating wage employment for the rural poor
(C) Shifting the entire rural population to urban industrial centers
(D) Rejuvenating degraded lands and improving soil health

117. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): The promotion of eco-tourism must be carefully regulated by the forest administration.
Reason (R): Unregulated tourism can lead to habitat degradation, wildlife disturbance, and eventual decline in the long-term economic value of the destination.
Which of the following is correct?
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

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118. The 'National Bamboo Mission' comes under which Union Ministry, given its immense focus on rural economy and farmers' income?
(A) Ministry of Environment, Forest and Climate Change
(B) Ministry of Agriculture and Farmers Welfare
(C) Ministry of Commerce and Industry
(D) Ministry of MSME

119. A major challenge in realizing the true economic potential of Non-Timber Forest Products (NTFPs) in India is:
(A) The excessive volume of complex scientific research currently overwhelming primary tribal gatherers
(B) Unorganized markets causing primary producer exploitation by middlemen

(A) It completely replaces staple food crops, reducing food security risks.
(B) Diversifying income through timber, fodder, and crop yields to buffer market risks
(C) It completely eliminates the requirement for applying any synthetic chemical or organic fertilizers to crops
(D) It ensures the farmer receives a monthly salary from the Forest Department.

86. Ecotourism carrying capacity refers to:
(A) The maximum weight a safari vehicle can carry
(B) The maximum permissible amount of money an individual tourist is legally allowed to spend per trip
(C) Maximum visitor volume sustained without environmental degradation
(D) The total number of tigers counted in a reserve

87. Under the Forest (Conservation) Act, 1980, if forest land is diverted for a developmental project, the user agency must pay the Net Present Value (NPV). These funds are collected under:
(A) The Consolidated Fund of India collected as general national tax revenue
(B) Prime Minister's National Relief Fund
(C) CAMPA (Compensatory Afforestation Fund Management and Planning Authority)
(D) District Mineral Foundation

88. In the global trade of forest produce, India's strict ban on the export of raw logs is primarily an economic policy designed to:
(A) Preventing any foreign currency from entering national financial institutions across trading sectors
(B) Promoting domestic wood manufacturing and handicraft value addition
(C) Destroy the livelihood of local timber fellers
(D) Increase global timber prices artificially

89. Which of the following forest products forms the basis of the traditional sericulture (silk) industry, significantly supporting rural incomes?
(A) Mulberry plant leaves
(B) Dried Sal tree seeds harvested for oil extraction
(C) Fallen pine needles gathered from forest floors
(D) Tender shoots collected from bamboo groves

90. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): The contribution of the forestry sector to the Indian economy is often underestimated in traditional GDP accounting.
Reason (R): Traditional GDP accounting does not adequately capture the value of non-marketed ecosystem services like water purification and soil conservation.
Which of the following is correct?
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

91. Match the following cottage industries of Uttar Pradesh (List I) with their primary raw material sourced from forests (List II):
List I: Cottage Industry
P. Bidi Making
Q. Match Industry
R. Paper Industry
S. Katha Extraction
List II: Primary Raw Material
1. Sabai Grass / Bamboo
2. Tendu Leaves
3. Semal Wood
4. Khair Heartwood
Which of the following is the correct matching?
(A) P-2, Q-3, R-1, S-4
(B) P-3, Q-2, R-4, S-1
(C) P-2, Q-1, R-3, S-4
(D) P-4, Q-3, R-1, S-2

92. Which of the following is the most appropriate description of 'Voluntary Carbon Markets' in the context of the forest economy?
(A) Government-mandated markets where states must buy credits from the central government
(B) Platforms where entities voluntarily buy carbon credits from forestry projects
(C) A system where rural agricultural farmers are legally mandated to plant trees and yield harvested wood for free
(D) An illegal underground market for smuggling timber

93. Forest degradation directly leads to the silting of reservoirs. This economically impacts hydroelectric projects primarily by:

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43. Lac is an essential non-timber forest product used in making dyes, cosmetics, and shellac. It is biologically produced by:
(A) The resinous sap of the Teak tree
(B) The natural fermentation process of fallen leaves from the Palash tree
(C) An insect (Kerria lacca) that feeds on specific host trees
(D) Extracting the core of the Khair tree

44. What is the primary focus of the 'National Afforestation Programme' (NAP) regarding rural economy?
(A) Creating large-scale private tea estates
(B) Restoring degraded forests through community participation while providing wage employment
(C) Subsidizing urban vertical gardens
(D) Mass importing foreign commercial timber to artificially stabilize fluctuating domestic market prices

45. Which economic principle explains the difficulty in capturing the true economic value of forest ecosystem services like carbon sequestration and climate regulation in free markets?
(A) Law of Diminishing Marginal Returns in Production
(B) Market Failure due to Public Goods / Externalities
(C) Comparative Advantage
(D) Economies of Scale

46. Under the current trend of government investment in the forest sector, the Green India Mission (GIM) focuses not only on increasing forest cover but also on:
(A) Maximizing the export of raw timber logs
(B) Enhancing existing forest cover quality and supporting rural livelihoods
(C) Privatizing all wildlife sanctuaries in the country
(D) Eradicating all forms of commercial agroforestry to preserve indigenous plant gene pools

47. In Uttar Pradesh, the 'One District One Product' (ODOP) scheme supports local industries. The wooden toys and artifacts industry, heavily dependent on local wood supplies, is the recognized ODOP of which district?
(A) Varanasi
(B) Lucknow
(C) Prayagraj
(D) Chitrakoot

48. Consider the following statements about the role of forests in disaster risk reduction (DRR) in mountainous regions:
I. Tree roots bind the soil, significantly reducing the occurrence of landslides.
II. A dense forest canopy increases the impact velocity of raindrops, accelerating soil erosion.
III. Forests delay the peak flow of water into rivers after heavy rainfall, mitigating flash floods.
Which of the statement(s) given above is/are incorrect?
(A) I only
(B) II only
(C) I and III only
(D) II and III only

49. The revenue structure of a state forest department typically includes receipts from which of the following?
(A) Income tax collected from rural farmers
(B) Royalties on timber, NTFP sales, and ecotourism entry fees
(C) Corporate tax collected from large domestic manufacturing industries
(D) Customs duty on imported electronic goods

50. A major source of indirect economic value from forests is their role in supporting agriculture through insect pollinators. This type of ecosystem service is categorized as a:
(A) Provisioning service
(B) Cultural service
(C) Regulating service
(D) Aesthetic service

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51. The Indian Forest Act of 1927 provides the legal framework for state control over forests. How does this act primarily aid in generating forest revenue for the state?
(A) By imposing a uniform income tax on all forest dwellers
(B) Regulating produce transit and levying royalties on timber and NTFPs
(C) Mandating the compulsory commercial export of all harvested forest products to foreign nations
(D) By selling shares of national parks in the stock market

proximity to forest areas
(B) The cumulative economic cost of pharmaceutical medicines directly derived from tropical forest plant species
(C) The entry fees of a botanical garden
(D) The daily wages of a forest guard

104. Which of the following is NOT a recognized source of revenue for the state forest department?
(A) Royalty on timber extracted
(B) Fine collected for forest offenses
(C) Goods and Services Tax (GST) on electronic software
(D) Lease rent collected from state lands assigned to eco-tourism resorts

105. Consider the following statements regarding the economic role of forests:
I. Forests contribute to the economy by providing raw materials for the pharmaceutical industry.
II. More than 70% of India's direct GDP comes exclusively from the forestry sector.
III. The cottage industry of basket weaving heavily relies on bamboo and cane sourced from forests.
Which of the statement(s) given above is/are correct?
(A) I and II only
(B) I and III only
(C) II and III only
(D) I, II, and III

106. In the context of rural livelihoods, what is 'Agri-silviculture'?
(A) The concurrent production of agricultural crops and forest trees on the same land
(B) The practice of rearing silkworms in closed indoor laboratories
(C) The cultivation of agricultural crops strictly after completely burning down a forest
(D) The breeding of silverfish in forest ponds

107. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): Removing bamboo grown outside forest areas from the legal definition of 'tree' under the Indian Forest Act boosted the rural economy.
Reason (R): It exempted non-forest bamboo from restrictive transit permit regulations, making its harvest, transport, and sale much easier for farmers.
Which of the following is correct?
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

108. Which district in Uttar Pradesh has a significant concentration of the plywood and veneer industry due to its historical access to timber from the Terai region?
(A) Sitapur
(B) Jhansi
(C) Mathura
(D) Agra

109. Which among the following ecosystems typically generates the highest economic value per hectare in terms of ecosystem services (such as storm protection, fish nurseries, and carbon storage)?
(A) Desert scrublands
(B) Coastal Mangroves / Estuaries
(C) Open grasslands
(D) High-altitude alpine snowfields

110. Identify the incorrect statement regarding the trade of Non-Timber Forest Products (NTFPs):
(A) NTFPs provide critical lean-season income for forest-dwelling communities.
(B) Trade in NTFPs is entirely untaxed and completely unregulated by the state government.
(C) Value addition to NTFPs at the village level can significantly increase the profit margin for gatherers.
(D) NTFPs include medicinal plants, gums, resins, and honey.

111. Consider the following states of India:
I. Madhya Pradesh
II. Uttar Pradesh
III. Arunachal Pradesh
Which of the following gives the correct descending order of these states in terms of total forest cover (area-wise) as per the India State of Forest Report (ISFR) 2021?
(A) I, III, II
(B) I, II, III
(C) III, I, II
(D) II, I, III

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(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

60. The process of calculating the 'Net Present Value' (NPV) of a forest is mandatory in India when:
(A) A private individual purchases agricultural land situated near a designated reserved forest boundary
(B) Diverting forest land for non-forest uses under conservation laws
(C) Forest officials retire and claim their pension
(D) NTFPs are sold in the local weekly market

61. Which of the following is the odd one out in terms of being a Major Forest Produce versus a Minor Forest Produce?
(A) Timber (Roundwood)
(B) Honey
(C) Tendu leaves
(D) Medicinal herbs

62. Which tribal livelihood initiative primarily focuses on organizing tribal gatherers into self-help groups and providing them with working capital and training for value addition?
(A) Pradhan Mantri Awas Yojana
(B) Van Dhan Yojana
(C) PM-SVANidhi
(D) Skill India Mission

63. Under the MGNREGA scheme, which of the following forest-related activities is legally permissible for generating rural employment?
(A) Clear-felling of dense natural forest areas to supply illicit timber smuggling networks
(B) Establishing forest nurseries and executing block plantations
(C) Establishing large-scale mechanized paper mills
(D) Commercial hunting of wild boars

64. State Forest Departments formulate 'Working Plans' for territorial forest divisions. What is the primary economic objective of a Working Plan?
(A) To maximize the immediate, one-time revenue from a forest irrespective of its ecological health
(B) To ensure the scientific and sustainable yield of forest produce over a 10 to 20-year cycle
(C) To plan the complete conversion of forests into agricultural zones
(D) To dictate the salaries of the forest guards

65. Essential oils play a significant role in the aromatic industry. The essential oil extracted from Khus (Vetiveria zizanioides) roots is widely used in perfumery. Khus is naturally found in which ecosystem?
(A) High-altitude alpine meadows and sub-alpine mountain slopes
(B) Desert scrub
(C) Waterlogged and marshy areas, often in the Terai region
(D) Coastal mangroves

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66. How does the implementation of the Minimum Support Price (MSP) for Minor Forest Produce (MFP) economically benefit tribal communities?
(A) By forcing them to buy forest produce at higher rates
(B) Eliminating middlemen to ensure fair baseline prices for gathered produce
(C) By taxing their gathered produce before it enters the market
(D) By strictly limiting the total physical quantity of forest produce they are permitted to consume personally

67. The transition from traditional forest management to 'Eco-development' around protected areas primarily aims to:
(A) Evict all indigenous communities from the buffer zones
(B) Providing alternative livelihoods to reduce local forest dependency
(C) Facilitating the construction of multi-story luxury hotel resorts directly inside core tiger habitats
(D) Allow industrial mining in the buffer zones

68. Consider the following legal and institutional frameworks related to the Indian forest economy:
I. Establishment of Uttar Pradesh Forest Corporation (UPFDC)
II. Enactment of the Indian Forest Act
III. Enactment of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act
Which of the following gives the correct chronological sequence of their establishment/ enactment?
(A) II, I, III
(B) I, II, III

(C) The complete absence of international demand for organic products
(D) The over-availability of cold storage facilities causing price crashes

120. In Uttar Pradesh, the forest department earns a significant part of its revenue through the auction of timber. Which of the following statements correctly describes this process?
(A) Timber is sold exclusively to international buyers at a fixed flat rate.
(B) Felled timber is sold via open e-auctions at government depots
(C) Harvested timber is provided completely free of charge to paper mills, while small local artisans pay full price
(D) The auctioning is done secretly without any public notice.

121. Consider the following statements about 'Carbon Sinks':
I. A carbon sink absorbs more carbon from the atmosphere than it releases.
II. Tropical forests are major natural carbon sinks.
III. The economic value of carbon sequestration is monetized through carbon credits.
IV. Afforestation decreases the capacity of a region to act as a carbon sink.
Which of the statement(s) given above is/are correct?
(A) I, II, and III only
(B) II, III, and IV only
(C) I, III, and IV only
(D) I, II, and IV only

122. Which of the following is the odd one out regarding the raw materials used in the paper and pulp industry?
(A) Bamboo
(B) Sabai grass
(C) Eucalyptus
(D) Lac

123. The economic strategy of 'Value Addition' in the context of medicinal plants implies:
(A) Plucking the plants before they reach maturity to save time
(B) Processing raw herbs into packaged powders or extracts prior to sale
(C) Artificially adding synthetic chemical adulterants to artificially inflate the total bulk weight of harvested herbs
(D) Selling the herbs exclusively to value-based religious institutions

124. How does the economic loss caused by the degradation of a catchment forest manifest downstream?
(A) As substantial increases in downstream agricultural crop yields resulting from beneficial topsoil silt deposition
(B) Higher flood frequency and increased downstream water treatment costs
(C) As an increase in the lifespan of downstream dams
(D) As a permanent reduction in local summer temperatures

125. The Indian Forest Act of 1927 provides for the creation of 'Reserved Forests'. What is the primary economic rationale behind establishing Reserved Forests?
(A) To grant unrestricted timber logging access and commercial rights to private industrial corporations
(B) Securing timber resources for the state through legal access restrictions
(C) To create vast lands for resettling urban slums
(D) To promote unrestricted shifting cultivation

126. The 'Replacement Cost Method' for ecosystem valuation evaluates a forest's service by estimating:
(A) The total financial expenditure associated with traveling long distances to visit an alternative natural forest
(B) Expenses to construct artificial infrastructure providing equivalent services
(C) The price of timber in the international market
(D) The cost of purchasing the entire forest land

127. Which of the following forms the basis of the 'Eco-mark' scheme launched by the Government of India, which indirectly supports the forest economy?
(A) Formally certifying that a commercial consumer product has been entirely imported from designated eco-friendly foreign nations
(B) Certifying consumer goods meeting eco-criteria to promote sustainability
(C) Certifying that a forest guard is physically fit
(D) Certifying animals fit for eco-tourism safaris

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national economic accounts for sustainable metrics
(C) To measure only the agricultural output of the green revolution
(D) To calculate the amount of green currency notes in circulation

145. The rural cottage industry of 'Pattal' and 'Dona' (leaf plates and bowls) is economically significant for forest fringe communities. Which tree leaves are most widely used for this purpose in northern and central India?
(A) Butea monosperma (Palash) and Shorea robusta (Sal)
(B) Pinus roxburghii (Chir Pine) harvested from high altitude Himalayan forests
(C) Dalbergia sissoo (Shisham)
(D) Azadirachta indica (Neem)

146. Which of the following is the most significant constraint in developing Public-Private Partnership (PPP) models in the Indian forestry sector?
(A) Lack of any degraded land in the country
(B) Complexities of land tenure, community rights, and forest ownership laws
(C) Total lack of demand for timber in the domestic market
(D) Over-abundance of state government financial allocations rendering private capital investments completely redundant

147. A core objective of the 'Sub-Mission on Agroforestry' (SMAF) is to encourage farmers to plant multi-purpose trees. What economic benefit does this bring besides timber yield?
(A) Enabling future farmer participation in voluntary carbon credit markets
(B) It completely sterilizes agricultural topsoil, eliminating the labor requirement for seasonal crop weeding
(C) It turns the agricultural land into a permanent government-owned forest.
(D) It stops the occurrence of all natural disasters in the district.

148. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): Investing in forest conservation is a cost-effective strategy for disaster risk reduction compared to building massive artificial flood-control infrastructure.
Reason (R): Healthy forests naturally regulate water flow, reduce soil erosion, and mitigate the impacts of extreme weather events over large landscapes.
Which of the following is correct?
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

149. The 'Katha' industry is economically significant in certain districts of Uttar Pradesh. Identify the district historically well-known for Katha manufacturing and cane furniture.
(A) Gorakhpur
(B) Bareilly
(C) Meerut
(D) Jhansi

150. Which of the following best defines the 'Value Chain' of a forest product?
(A) The physical transportation routes and logistics corridors connecting deep interior forests to urban commodity markets
(B) Sequential stages from raw material harvest to retail sale adding product value
(C) The chain of command within the forest department
(D) The food chain in the forest ecosystem

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151. Consider the following statements regarding the role of the forest department in economic management:
I. It ensures sustainable yield by enforcing scientifically prepared Working Plans.
II. It facilitates livelihood generation by engaging local communities in plantation activities.
III. It regulates the prices of heavy industrial machinery.
IV. It manages the auction of salvage timber and seized forest produce.
Which of the statement(s) given above is/are correct?
(A) I, II, and III only
(B) I, II, and IV only
(C) II, III, and IV only
(D) I, III, and IV only

152. Which scheme was launched to harness the economic potential of bamboo by organizing farmers, artisans, and markets, given its diverse applications from construction to handicrafts?

(D) Turpentine oil

137. Which of the following correctly defines 'Agro-forestry' in contrast to 'Social Forestry'?
(A) Agro-forestry is legally restricted to state government land, whereas social forestry is practiced strictly on private properties
(B) Agro-forestry combines trees with farm crops, while social forestry plants community lands
(C) Agro-forestry forbids the harvesting of trees, while social forestry mandates it.
(D) Agro-forestry only uses exotic species, while social forestry uses only native species.

138. The demand for 'Certified Timber' is growing in international markets. What does timber certification (like FSC - Forest Stewardship Council) ensure economically?
(A) That the timber is the cheapest available in the market
(B) Sustainable forest management verification yielding premium market prices
(C) That the timber is completely synthetic and not real wood
(D) That the harvested timber was successfully smuggled across international borders without paying state import taxes

139. Match the following major forest types (List I) with their corresponding region in Uttar Pradesh where they hold economic significance (List II):
List I: Forest Type
P. Tropical Moist Deciduous
Q. Tropical Dry Deciduous
R. Tropical Thorn Forest
List II: Region
1. Western and South-Western UP (e.g., Mathura, Agra)
2. Terai and Bhabar region (e.g., Lakhimpur Kheri)
3. Central and Eastern Gangetic Plains
Which of the following is the correct matching?
(A) P-2, Q-3, R-1
(B) P-1, Q-2, R-3
(C) P-3, Q-1, R-2
(D) P-2, Q-1, R-3

140. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): The trade balance of India's forest sector shows a deficit.
Reason (R): India exports large volumes of raw timber while importing only cheap, low-value wood products.
Which of the following is correct?
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

141. The economic potential of eco-tourism in Uttar Pradesh received a major push with the establishment of the 'Uttar Pradesh Eco-Tourism Development Board'. In which year was this board prominently approved/constituted by the state cabinet?
(A) 2002
(B) 2014
(C) 2022
(D) 1988

142. Consider the following statements about 'Transit Rules' in the forest economy:
I. Transit rules are framed to prevent the smuggling of illicitly felled timber.
II. A transit pass/permit is required to transport specified forest produce from one place to another.
III. Transit rules completely prohibit the transport of agricultural grains.
Which of the statement(s) given above is/are correct?
(A) I and II only
(B) I and III only
(C) II and III only
(D) I, II, and III

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143. Which sector relies heavily on the 'Gum Karaya' extracted from the Sterculia urens tree, primarily found in dry deciduous forests?
(A) Heavy industrial metallurgy, blast furnace operations, and commercial steel manufacturing
(B) Food, pharmaceutical, and cosmetics production
(C) Brick manufacturing
(D) Synthetic fiber production

144. Which of the following is a primary objective of calculating 'Green GDP'?
(A) To artificially inflate gross national income statistics to secure favorable high-volume loans from international banks
(B) Incorporating resource depletion into

(D) I, II, and III

160. The economic valuation of a forest's 'Regulating Services' would primarily include the value of:
(A) The total commercial volume of industrial timber harvested annually by a licensed logging company
(B) The carbon sequestered and the flood mitigation provided by the forest
(C) The entry tickets sold to a bird sanctuary
(D) The honey collected by tribal gatherers

161. The 'Minimum Support Price (MSP) for Minor Forest Produce' scheme is implemented through state-level agencies. In this context, how is the MSP determined?
(A) It is arbitrarily decided by local forest guards.
(B) Fixed by Tribal Affairs based on TRIFED pricing recommendations and collection costs
(C) It is legally pegged directly to fluctuating benchmark prices of crude oil in global international markets
(D) It is fixed at zero to ensure free supply to industries.

162. Which of the following is the odd one out regarding the application of the 'Polluter Pays Principle' in forest economics?
(A) Imposing Net Present Value (NPV) charges on a mining company clearing a forest
(B) Collecting Compensatory Afforestation charges from a dam developer
(C) Paying daily wages to a tribal laborer under MGNREGA for planting trees
(D) Levying a fine on an industry discharging toxic effluents into a forest river

163. How does the 'Joint Forest Management' (JFM) approach positively impact the forest-based economy?
(A) By completely commercializing public forest lands and floating corporate stock shares on international financial stock exchanges
(B) Fostering community ownership, curbing illegal logging, and sharing forest revenue
(C) By replacing all natural forests with synthetic parks
(D) By outsourcing forest protection exclusively to private security agencies

164. What economic impact does a high rate of forest fires have on the state's forest economy?
(A) It permanently enhances forest soil fertility levels, thereby effectively doubling long-term timber output capacity
(B) Causes timber/NTFP losses, fire fighting costs, and severe ecosystem damage
(C) It boosts the eco-tourism sector by clearing undergrowth.
(D) It is entirely beneficial as it immediately generates carbon credits.

165. Consider the following statements regarding the economic role of mangrove forests:
I. They support the livelihoods of local fishing communities.
II. They provide high-quality timber for the construction of ships and boats.
III. They protect coastal infrastructure from massive economic damages during cyclones.
IV. They are entirely devoid of any commercially viable flora or fauna.
Which of the statement(s) given above is/are correct?
(A) I, II, and III only
(B) II, III, and IV only
(C) I, III, and IV only
(D) I, II, and IV only

166. Which district in Uttar Pradesh, heavily reliant on forest resources, is famous for its 'Bidi' making cottage industry?
(A) Gautam Buddha Nagar
(B) Lalitpur / Jhansi
(C) Ghaziabad
(D) Kanpur Nagar

167. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): The economic potential of eco-tourism in Uttar Pradesh is largely untapped compared to states like Madhya Pradesh or Uttarakhand.
Reason (R): Uttar Pradesh has zero wildlife sanctuaries and completely lacks any natural forest cover.
Which of the following is correct?
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

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(A) National Mission for Sustainable Agriculture
(B) National Bamboo Mission
(C) Rashtriya Krishi Vikas Yojana
(D) Pradhan Mantri Krishi Sinchayee Yojana

153. What is the primary reason the economic contribution of the forestry sector to India's GDP appears to be less than 2%?
(A) India has completely run out of forests.
(B) GDP focuses on recorded timber, ignoring unrecorded NTFPs and ecosystem services
(C) The international export of all forest-derived raw materials is strictly banned under United Nations sanctions
(D) Forest lands generate no economic value whatsoever.

154. Under the concept of Green GDP, if a country logs all its forests in one year to sell timber, how would this reflect on the Green GDP compared to the conventional GDP?
(A) Both Green GDP and conventional GDP would increase equally.
(B) Conventional GDP rises, while Green GDP falls due to natural capital loss
(C) Green GDP metrics would register a substantial increase, whereas conventional GDP output figures would rapidly decrease
(D) Neither GDP metric would register any change.

155. Match the following terms related to forest economics (List I) with their meanings (List II):
List I: Term
P. Royalties
Q. Ex-gratia
R. Seigniorage
S. Stumpage
List II: Meaning
1. The price paid for the right to harvest standing timber
2. Financial compensation paid to victims of human-wildlife conflict
3. Fees paid to the government for the extraction of mineral or forest resources
4. The net revenue derived from a forest property

Which of the following is the correct matching?
(A) P-3, Q-2, R-4, S-1
(B) P-1, Q-2, R-3, S-4
(C) P-3, Q-4, R-1, S-2
(D) P-2, Q-3, R-4, S-1

156. In the context of eco-tourism revenue, what is the primary function of an Eco-Development Committee (EDC)?
(A) To construct large multi-story commercial shopping complexes and entertainment centers directly inside protected tiger reserves
(B) Managing local eco-tourism and directing revenue shares to community development
(C) To privatize the entire buffer zone and sell it to foreign tour operators
(D) To train tigers for circus performances

157. Which of the following is considered an indirect economic impact of forests on the agriculture sector in the Indo-Gangetic plains?
(A) Provision of expansive continuous tracts of fertile government land designated for heavy mechanized farming operations
(B) Recharging groundwater aquifers to sustain local agricultural tube-well irrigation
(C) Direct supply of genetically modified seeds
(D) Provision of chemical pesticides

158. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): The government has removed price caps and complex transit rules for several agroforestry timber species.
Reason (R): Easing regulations encourages farmers to adopt agroforestry, thereby increasing wood supply and boosting the rural economy.
Which of the following is correct?
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

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159. Consider the following statements about the trade of forest produce in India:
I. India relies heavily on imports to meet its domestic demand for pulp and paper.
II. India is a significant exporter of value-added wooden handicrafts.
III. The import of round logs is strictly banned to protect domestic natural forests.

Which of the statement(s) given above is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only

128. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): The government actively encourages the cultivation of specific tree species like Poplar and Eucalyptus on agricultural bunds.
Reason (R): It reduces the raw material pressure on natural forests and provides a supplementary cash crop for farmers.
Which of the following is correct?
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

129. Consider the following sequence of steps in implementing a typical REDD+ project:
I. Measuring baseline forest carbon stock
II. Implementing conservation/afforestation measures
III. Receiving financial compensation (carbon credits) based on verified results
IV. Monitoring and verifying the increase in carbon stock
Which of the following represents the correct logical arrangement of these steps?
(A) I, II, IV, III
(B) II, I, III, IV
(C) I, IV, II, III
(D) IV, I, II, III

130. The 'Van Mahotsav' festival, initiated in 1950 in India, primarily aims at:
(A) Officially celebrating the commercial clear-felling of mature timber forests for rapid urban industrial expansion
(B) Raising public awareness and participation in tree planting activities
(C) Promoting the hunting of wild animals for economic gain
(D) Worshiping forest deities without any active plantation efforts

131. Which of the following trees is commercially exploited in Uttar Pradesh for making sports goods like hockey sticks and gymnasium equipment due to its tough and elastic wood?
(A) Mulberry (Morus alba)
(B) Babul (Acacia nilotica)
(C) Mango (Mangifera indica)
(D) Neem (Azadirachta indica)

132. Consider the following statements regarding the 'National Working Plan Code':
I. It standardizes the procedure for preparing forest working plans across the country.
II. It requires the integration of non-timber forest products and ecosystem services into forest management.
III. It completely ignores the economic aspects of forest harvesting.
Which of the statement(s) given above is/are correct?
(A) I only
(B) I and II only
(C) II and III only
(D) I, II, and III

133. What is the primary role of 'Forest Development Corporations' established by various state governments, including UP?
(A) To conduct extensive basic scientific research on plant genetics and cellular tissue culture across state laboratories
(B) Managing commercial logging and timber marketing operations independently
(C) To arrest wildlife poachers and prosecute them in court
(D) To frame national environmental laws

134. Which of the following NTFPs is extensively used in the manufacturing of indigenous incense sticks (agarbatti) as a binding agent?
(A) Jigat powder (Machilus bark)
(B) Processed natural Sal tree resin
(C) Tendu leaf waste
(D) Pine needles

135. The economic losses due to human-wildlife conflict (e.g., crop depredation by elephants) are a significant burden on the rural economy. What is the primary economic mechanism used by the state to address this?
(A) Supplying free structural timber and construction materials to all affected rural agricultural farmers
(B) Disbursing direct ex-gratia monetary compensation to victims
(C) Relocating all farms to urban centers
(D) Imposing a tax on wildlife lovers

136. Which of the following is the odd one out based on its primary economic use?
(A) Taxol
(B) Quinine
(C) Sarpagandha extract

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168. The Indian Forest Service (IFS) plays a key role in the economic management of forests. At the district or divisional level, who is the principal executing officer responsible for managing forest revenue, timber auctions, and implementing the working plan?
(A) Principal Chief Conservator of Forests (PCCF) operating at state headquarters
(B) Divisional Forest Officer (DFO) / Deputy Conservator of Forests (DCF)
(C) Forest Guard
(D) Chief Minister

169. What is the primary source of funding for the 'Green India Mission' (GIM) which aims at protecting, restoring, and enhancing India's diminishing forest cover?
(A) Exclusively foreign direct investment (FDI) from private timber corporations
(B) Convergence with CAMPA funds and the MGNREGA scheme
(C) Imposing a direct 'Green Tax' on agricultural farmers
(D) Selling national parks to international NGOs

170. Which of the following best represents the relationship between the Sustainable Development Goals (SDGs) and the forest economy?
(A) SDGs mandate the complete and immediate cessation of all commercial economic activities within designated forest zones
(B) Forest management (SDG 15) supports poverty reduction (SDG 1) and growth (SDG 8)
(C) SDGs require all forests to be converted into agricultural land to end hunger.
(D) SDGs classify forestry as an obsolete sector with no economic value.

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harvested from Diospyros melanoxylon trees for bidi wrapping. Lac is biologically produced by lac insects hosted on Palash or Kusum trees. Commercial resin is extracted from Chir pine trees through tapping, while Katha is extracted from the heartwood of the Khair tree.

19. (C) Bundelkhand and Vindhyan region
The southern landscape of Uttar Pradesh, encompassing the rocky terrain of the Bundelkhand and Vindhyan belts, provides optimal growth conditions for Diospyros melanoxylon trees. Local rural and tribal populations collect Tendu leaves extensively throughout these dry deciduous forest regions, generating vital seasonal employment and primary income during lean agricultural periods prior to monsoon rains.

20. (D) MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act)
The Mahatma Gandhi National Rural Employment Guarantee Act integrates rural wage employment with natural resource management. It mandates funding for eco-restoration projects including sapling nursery creation, afforestation campaigns, trenching, soil conservation, and small-scale water harvesting structures. This integration creates durable ecological assets while guaranteeing social security and rural household financial support nationwide.

21. (C) Net importer of timber and industrial wood owing to domestic conservation policies
To conserve domestic forest cover and maintain ecological integrity, national forestry policies restrict commercial felling in natural forests. Combined with rising domestic demand for paper, furniture, and construction materials, India operates as a net importer of raw timber and industrial roundwood, relying heavily on international markets to satisfy internal wood processing requirements.

22. (B) Indian Forest (Amendment) Act, 2017
The Indian Forest (Amendment) Act of 2017 modified the legal classification of bamboo grown on non-forest land by removing it from the definition of trees under forest regulations. This legal change eliminated strict transit permit requirements for non-forest bamboo, enabling farmers to freely grow, harvest, transport, and commercialize bamboo as an agricultural cash crop.

23. (B) Managing funds from diverted forest lands to execute compensatory afforestation
The Compensatory Afforestation Fund Management and Planning Authority oversees money collected from infrastructure developers when forest land is diverted for non-forest purposes. These funds cover net present value assessments and land creation expenses. The agency channels these resources toward structured afforestation drives, wildlife habitat protection, and forest regeneration projects across various state jurisdictions.

24. (C) I, II, and IV only
Carbon credits quantify metric tons of sequestered carbon dioxide equivalent, forming the base mechanism for international programs like REDD+ that compensate nations for preserving ecosystems. Reforestation and afforestation schemes generate these credits. However, Indian organizations do actively participate in global voluntary carbon markets, making claims of total non-participation inaccurate within environmental carbon economic frameworks.

25. (B) Reduced ecosystem services increasing water purification and flood control costs
Forest degradation impairs essential natural functions including hydrological regulation, sediment filtering, and microclimate stabilization. When these natural systems decline, society faces substantial financial burdens to replace lost services through artificial means. Public expenditures must rise for building water treatment plants, constructing artificial flood control structures, and repairing infrastructure damaged by frequent natural disasters.

26. (B) Uttar Pradesh Forest Corporation (UPFDC)
The Uttar Pradesh Forest Corporation functions as the dedicated state statutory body charged with commercial operations across public forest areas. It conducts scientific extraction, timber logging, depot storage, and transparent public auctions for harvested wood and minor forest produce, ensuring structured commercial realization while eliminating illegal logging and exploitative private timber trading networks.

27. (C) Sequential steps from harvest, processing, and packaging to marketing that increase product value
A value chain encompasses the full range of activities involved in bringing a forest product

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two commercially essential secondary products: turpentine oil and solid rosin. These processed chemical outputs serve as foundational raw inputs in manufacturing synthetic adhesives, varnish coatings, printing inks, soaps, paper sizing agents, and various industrial solvents across processing facilities.

10. (A) TRIFED
The Tribal Cooperative Marketing Development Federation of India operates as the specialized national apex organization responsible for implementing economic welfare initiatives for indigenous gatherers. It manages the Minimum Support Price scheme for minor forest produce, establishing baseline floor prices, setting up procurement mechanisms, and preventing exploitative trade practices by private intermediaries operating in rural forest regions.

11. (D) Katha
Katha is a vegetable extract derived by boiling the heartwood chips of the Khair tree in water followed by crystallization. This valuable non-timber product forms a core ingredient in traditional pan preparations and herbal pharmaceutical formulations due to its astringent properties. Extraction facilities operate extensively in regions where Khair trees grow naturally in abundance.

12. (A) I and II only
Pradhan Mantri Van Dhan Yojana focuses on tribal empowerment by establishing grassroot Van Dhan Vikas Kendras to promote enterprise formation and value addition for gathered minor forest produce. However, the scheme is executed under the Ministry of Tribal Affairs with operational support from TRIFED, rather than being managed entirely by the Ministry of Environment, Forest and Climate Change.

13. (C) By reducing soil erosion to prevent reservoir siltation and prolong dam operational lifespan
Forest vegetation and root networks act as natural land stabilizers across river catchment basins, preventing heavy topsoil wash-off during rainstorms. By minimizing erosion, forests reduce sediment accumulation in downstream hydroelectric reservoirs. This hydrological regulation prevents turbine damage, preserves reservoir storage capacity, and significantly extends the operational lifespan and economic efficiency of hydro power generation facilities.

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14. (D) Carbon sequestration
Direct provisioning services involve physical resources harvested straight from natural ecosystems, such as timber, wild fruits, and medicinal plants. In contrast, carbon sequestration is an indirect regulating service where forest vegetation captures atmospheric carbon dioxide. This process stabilizes global climatic systems, representing an ecosystem function that provides indirect economic and environmental benefits worldwide.

15. (A) Individual willingness to pay (WTP) for environmental conservation
The Contingent Valuation Method is a survey-based economic technique used to measure non-market environmental goods. It directly asks individuals to state their monetary willingness to pay for preserving specific natural resources or willingness to accept compensation for environmental degradation. This methodology enables economists to construct hypothetical markets to quantify total non-use and existence ecosystem values.

16. (B) Formation of Eco-Development Committees (EDCs) that share a percentage of tourism revenue
Eco-Development Committees serve as institutional mechanisms in fringe forest zones designed to involve local communities directly in wildlife management. A defined portion of eco-tourism entry fees and commercial revenues is channeled back into these community-run committees. This structure funds local infrastructure development, generates alternative employment options, and reduces economic dependence on forest exploitation.

17. (B) Willow
High-grade cricket bats require timber that combines low density with high mechanical strength, shock resistance, and flexibility. Wood derived from willow trees naturally fulfills these requirements, absorbing severe ball impacts without splintering easily. Consequently, willow timber serves as the worldwide standard material for manufacturing professional cricket equipment, supporting specialized sports manufacturing industries.

18. (A) P-4, Q-3, R-2, S-1
Specific forest trees yield distinct economic outputs across industries. Tendu leaves are

ANSWERS

1. (B) The economic cost of environmental degradation and resource depletion
Green GDP modifies standard Gross Domestic Product figures by factoring in environmental consequences associated with economic growth. It deducts the financial costs of natural resource depletion and environmental degradation from conventional economic output. This metric provides a realistic assessment of sustainable development by accounting for natural capital losses alongside traditional financial measurements of overall national production.

2. (A) Travel Cost Method
The Travel Cost Method is an economic valuation technique used to evaluate ecosystem services associated with recreational areas like national parks and forests. It estimates values based on the monetary expenditure and time incurred by visitors traveling to the site. This approach reflects public willingness to pay based on actual consumer behavior regarding access to non-market recreational landscapes.

3. (A) Primary Sector
The primary sector of an economy encompasses activities involving the direct extraction and harvesting of natural resources. Forestry and logging operations fall under this classification because they involve direct collection of timber and natural materials from forest lands. These activities supply crucial unmanufactured inputs to secondary manufacturing industries, establishing foundational support across broader supply chains nationwide.

4. (D) Enhancing soil moisture conservation and preventing soil erosion
Forests provide essential indirect ecological support to surrounding agricultural systems by maintaining hydrologic stability and maintaining topsoil structure. Tree roots anchor soil layers to minimize erosion, while forest canopies cushion rainfall impacts and enhance water infiltration. This natural regulation preserves soil fertility and soil moisture levels, directly supporting stable crop production across adjacent agricultural farmland.

5. (C) Sabai grass (Bhabar)
Sabai grass, also commonly known as Bhabar grass, is a tough perennial species naturally abundant across the northern sub-Himalayan tracts. Due to its long cellulose fibers, high tensile strength, and suitability for pulp processing, it serves as a crucial traditional raw material for paper manufacturing and cordage industries in northern India, particularly in Uttar Pradesh.

6. (B) Saharanpur
Saharanpur district in Uttar Pradesh is globally recognized for its vibrant wooden handicraft and delicate wood carving industry. This traditional cluster relies on skilled craftsmanship and localized timber processing to generate significant employment. The industry serves as a major driver for the state's forest-based commercial economy through both extensive domestic distribution and substantial international export markets.

7. (D) Semal (Bombax ceiba)
Semal wood, obtained from Bombax ceiba, possesses unique structural properties including soft texture, light weight, straight grain, and rapid drying characteristics. These physical features make it the primary commercial timber choice for manufacturing match splints and packaging boxes across India, as it burns evenly and accepts chemical treatments efficiently during safety match production processes.

8. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Official national income accounts primarily capture recorded commercial timber sales, often underrepresenting total economic output from forest areas. Many non-timber forest products and essential ecosystem services are either consumed locally or traded through unorganized informal markets. Consequently, unpriced ecological benefits remain excluded from formal gross domestic product calculations, creating a lower apparent statistical contribution.

9. (C) Turpentine and rosin industry
Resin extracted from pine species, particularly Chir pine, undergoes steam distillation to yield

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from its raw gathering stage to its final consumer state. For non-timber produce like Mahua or Amla, this process involves harvesting, cleaning, grading, secondary processing, packaging, branding, and marketing. Each sequential stage adds commercial economic value to raw materials.

28. (A) Harvesting → Processing/Refining → Packaging → Marketing
The value chain for non-timber forest produce follows a logical commercial sequence starting with raw material collection in forest zones. Gatherers harvest the raw produce, which then undergoes processing and refining to improve quality and shelf life. The refined product is subsequently packaged for protection and presentation before being distributed to consumer markets through marketing networks.

29. (C) SDG 15
Sustainable Development Goal 15 specifically focuses on terrestrial ecosystems, aiming to protect, restore, and promote their sustainable management. It addresses critical global environmental priorities including halting deforestation, combating desertification, reversing land degradation, and protecting biodiversity, providing an international policy framework for integrating ecological conservation into broader economic development planning.

30. (B) Reclaiming degraded forest lands through private investment in plantation activities
Public-Private Partnerships in forestry aim to leverage private capital, technical expertise, and modern management practices to restore degraded forest areas. Under strict environmental regulatory oversight, these arrangements help establish industrial wood plantations on degraded sites without privatizing natural national parks, thereby relieving raw material pressure on natural ecosystems and promoting sustainable resource management.

31. (D) Mangrove forests
Mangrove forests possess dense, interconnected root systems that dissipate wave energy, stabilize coastal sediment, and attenuate storm surges during severe weather events. By shielding coastal settlements and agricultural lands from cyclone damage and coastal erosion, mangroves provide invaluable economic protection, significantly reducing expenditures on concrete sea walls and emergency storm disaster recovery operations.

32. (A) Sal timber
Forest revenue classifications categorize products into major and minor produce. Major forest produce consists primarily of high-value structural timber items including roundwood, logs, and fuelwood harvested from species like Sal. Minor forest produce encompasses non-timber items like tendu leaves, wild honey, seeds, and medicinal herbs collected under different revenue and regulatory frameworks.

33. (C) Kyoto Protocol
The Clean Development Mechanism was established under the Kyoto Protocol to assist industrial nations in meeting emission targets while promoting sustainable development in developing countries. It enables emission-reduction and afforestation initiatives in developing nations to earn certified emission reduction credits, creating a global financial mechanism for monetizing climate mitigation and forest sequestration projects.

34. (D) Regulating hydrological cycles to maintain downstream water supply and mitigate flood damage
Forests perform vital hydrological functions within water catchment zones by intercepting rainfall, increasing ground infiltration, and regulating seasonal river runoff. This natural regulation prevents flash flooding during monsoon peaks and maintains steady streamflow during dry periods, ensuring consistent water availability for agriculture, domestic supply, and power generation while lowering infrastructure maintenance costs.

35. (A) P-2, Q-3, R-4, S-1
Medicinal plants yield specialized compounds across economic sectors. Sarpagandha produces reserpine used in high blood pressure remedies. Himalayan Yew contains taxane alkaloids utilized for manufacturing anti-cancer drugs like Taxol. Neem yields azadirachtin used for biopesticides and cosmetics, while Amla fruits provide natural Vitamin C for immunity boosters.

36. (B) Gram Sabha
The Scheduled Tribes and Other Traditional Forest Dwellers Act recognizes the Gram Sabha as the primary legal authority for managing

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capital depletion, achieving long-term resource sustainability.

113. (B) Conserve community forest resources for sustainable use
The Scheduled Tribes and Other Traditional Forest Dwellers Act grants statutory rights to local communities to protect, regenerate, conserve, and manage community forest resources. These provisions empower Gram Sabhas to manage traditional forest areas sustainably, protect biodiversity against external threats, and secure long-term local access to traditional forest resources.

114. (B) Cooperative model where tribal gatherers pool and market produce
Van Dhan Vikas Kendras operate on a community cooperative business model tailored for forest fringe tribal areas. Primary collectors form self-help groups to aggregate harvested produce, utilize shared processing infrastructure, add value through basic refining, and market finished items collectively, eliminating middleman exploitation and maximizing profit retention within tribal communities.

115. (A) P-3, Q-2, R-1, S-4
Economic framework classifications organize ecosystem service values into distinct categories. Direct use values originate from direct physical consumption like timber logging or recreation. Indirect use values stem from environmental regulation like climate control. Bequest values reflect preservation for future generations, while existence value stems from knowing natural habitats endure.

116. (C) Shifting the entire rural population to urban industrial centers
Integrating forestry projects with the MGNREGA scheme aims to restore degraded ecosystems, improve soil and water conservation, and build durable community infrastructure while providing local wage employment. Encouraging population displacement or migrating rural workers to urban industrial centers contradicts the core rural stabilization objectives of these government programs.

117. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Eco-tourism activities within protected forest areas require strict regulatory oversight to balance visitor access with ecological conservation. Uncontrolled tourist influxes, excess vehicle traffic, and infrastructure expansion cause habitat fragmentation and wildlife disturbance, ultimately degrading natural ecosystems and destroying the environmental value that attracts eco-tourists.

118. (B) Ministry of Agriculture and Farmers Welfare
The National Bamboo Mission operates under the Ministry of Agriculture and Farmers Welfare to promote non-forest bamboo cultivation. Realigned to focus on farm-based bamboo production, the mission links agricultural growers with industrial processing hubs, supporting farm diversification, rural craft enterprises, and supplementary income generation across farming communities nationwide.

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119. (B) Unorganized markets causing primary producer exploitation by middlemen
A primary challenge limiting economic returns from non-timber forest products is the unorganized nature of rural trade. Primary gatherers often work in remote locations with limited market access, transparent price information, storage facilities, or bargaining power, leaving them vulnerable to price manipulation and exploitation by private traders and intermediaries.

120. (B) Felled timber is sold via open e-auctions at government depots
State forest departments and forest development corporations market legally harvested timber using open competitive bidding processes. Felled timber logs are transported to designated government timber depots, graded systematically by species and size, and sold to registered buyers through transparent public e-auctions to ensure competitive market pricing.

121. (A) I, II, and III only
Carbon sinks absorb more carbon dioxide than they release, making tropical forests crucial for global carbon balance. These ecological mitigation services are monetized through carbon credit markets. Because afforestation increases overall tree cover and carbon uptake capacity, asserting that planting trees reduces carbon sink capacity is factually incorrect.

positive environmental externalities, forest owners receive no automatic financial compensation for maintaining ecosystem integrity. This standard market failure leads to systemic underinvestment in natural resource conservation.

46. (B) Enhancing existing forest cover quality and supporting rural livelihoods
The National Mission for a Green India operates as a major environmental initiative focusing on increasing overall forest and tree canopy while improving the ecological quality of existing moderately dense and degraded forests. It integrates ecological restoration with community development, enhancing ecosystem services like water security while strengthening forest-dependent livelihoods.

47. (D) Chitrakoot
Under Uttar Pradesh's One District One Product scheme, Chitrakoot district is designated for its traditional wooden toys and wooden craft industry. Local artisans utilize sustainably sourced local timber to craft detailed wooden toys, home decor items, and religious artifacts, providing vital livelihood opportunities and preserving traditional woodcraft skills across the region.

48. (B) II only
In mountainous terrains, forest canopies act as protective shields, reducing the kinetic energy of falling rain and enabling gentle soil infiltration. This canopy structure reduces, rather than increases, raindrop impact velocities, thereby mitigating splash erosion. Meanwhile, root systems bind soil layers and delayed peak runoff helps prevent destructive landslides and seasonal flash floods.

49. (B) Royalties on timber, NTFP sales, and ecotourism entry fees
State forest departments generate non-tax revenues through natural resource commercialization and regulatory fees. Principal revenue streams include royalties levied on commercial timber logging, sales proceeds from non-timber forest produce, collection permits, entry fees from national parks and wildlife sanctuaries, and administrative fines imposed for environmental or forestry violations.

50. (C) Regulating service
Regulating services encompass environmental benefits derived from ecosystem processes that control natural conditions. Wild insect pollinators residing in forest margins provide crucial pollination for adjacent agricultural crops, enhancing fruit and seed yields. This natural regulation supports agricultural output without requiring direct physical inputs, placing insect pollination firmly within the regulating ecosystem service category.

51. (B) Regulating produce transit and levying royalties on timber and NTFPs
The Indian Forest Act of 1927 provides legal provisions for state regulation over forest areas and produce movement. It establishes mechanisms for setting up check posts, issuing transit permits, controlling timber transit, and charging royalties or duties on forest produce. This legal oversight secures state revenue generation while curbing illicit logging and unrecorded resource exploitation.

52. (B) Poplar (Populus deltoides)
Poplar is a fast-growing deciduous tree widely adopted in farm forestry across northern plains including Uttar Pradesh. Its rapid rotation period, straight trunk, soft wood texture, and suitability for rotary peeling make it the principal timber input for regional safety match splints, veneer, and commercial plywood industries, offering farmers high economic returns.

53. (B) Valuing unpriced or underpriced forest goods and ecosystem services
Shadow pricing is an analytical technique used in environmental economics to assign monetary values to goods and services lacking direct market prices. Because critical ecosystem functions like microclimate control, soil conservation, and biodiversity preservation are unpriced, shadow prices estimate their true economic worth to guide sustainable policy planning and project evaluations.

54. (B) Integrating ecosystem physical and economic values into national accounts
Ecosystem Accounting provides a structured framework for measuring natural assets and tracking changes in ecosystem extent, condition, and service flows over time. By incorporating ecosystem physical quantities and economic valuations into national accounting metrics, it

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community forest resources. This village assembly holds statutory powers to register claims, protect biodiversity, regulate access to non-timber forest produce, and make decisions regarding local forest conservation and community development initiatives.

37. (B) Satisfaction derived from knowing a pristine natural reserve exists without visiting it
Non-use or existence value refers to the economic worth individuals place on the mere preservation of a natural resource, independent of any direct or indirect personal consumption. The psychological satisfaction gained from knowing that pristine wild ecosystems or endangered species are protected for future generations represents a classic non-use value in environmental resource economics.

38. (A) I and II only
Indian Forest Service officers are administrative stewards responsible for drafting scientific Working Plans and managing revenue collection from timber sales and forest fees. However, agricultural pricing mechanisms like Minimum Support Prices fall strictly under agricultural ministries and pricing commissions, remaining completely outside the administrative mandate of forestry officials.

39. (C) Cane furniture and Surma
Bareilly district in Uttar Pradesh has a rich history of traditional handicraft manufacturing, particularly famous for high-quality cane furniture, bamboo articles, and Surma production. The local enterprise relies on natural cane, grass, and forest raw materials sourced through established supply networks, significantly boosting the district's rural non-farm economy and artisanal employment.

40. (A) Jointly sharing forest protection duties and economic benefits between authorities and communities
Joint Forest Management is an institutional approach designed to rebuild degraded forest ecosystems through partnerships between local village communities and state forest departments. Under this framework, villagers participate in forest protection activities in exchange for usufruct rights over specified non-timber produce and a defined share of final commercial timber harvest proceeds.

41. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Cultivating medicinal and aromatic plants often generates higher profit margins per unit area than standard grain crops due to substantial global demand from pharmaceutical, cosmetic, and wellness sectors. This expanding market requirement drives high purchase prices, making herb cultivation an economically attractive cash-cropping alternative for farmers operating in conducive agro-climatic zones.

42. (D) Trees Outside Forests (TOF) and agroforestry plantations
Strict conservation mandates and reduced logging allowances in natural public forests have shifted wood supply sources toward private agricultural lands. Modern plywood and veneer manufacturing units obtain the vast majority of their timber raw materials from fast-growing agroforestry trees and trees outside forests, such as Poplar and Eucalyptus grown by regional farmers.

43. (C) An insect (Kerria lacca) that feeds on specific host trees
Lac is a natural resinous secretion produced by tiny scale insects, scientifically named Kerria lacca. These insects colonize and feed on sap from specific host trees like Palash, Kusum, and Ber. The secreted resin crust harvested from branches is refined into shellac, serving as an important source of supplementary income for tribal gatherers.

44. (B) Restoring degraded forests through community participation while providing wage employment
The National Afforestation Programme aims to restore degraded forest lands by institutionalizing joint forest management through Forest Development Agencies and Eco-Development Committees. By engaging local villagers in site preparation, nursery management, planting, and protection, the program directly improves rural economic stability through wage distribution and enhanced natural resource access.

45. (B) Market Failure due to Public Goods / Externalities
Forest ecosystem services like carbon storage and climate stabilization possess non-excludable and non-rival properties characteristic of public goods. Because private markets fail to price these

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64. (B) To ensure the scientific and sustainable yield of forest produce over a 10 to 20-year cycle
A forest Working Plan acts as a foundational management instrument for territorial forest divisions. It analyzes standing stock, ecosystem health, and growth rates to fix allowable annual timber cutting limits over ten to twenty-year periods. This scientific management prevents over-exploitation, ensuring that extraction rates remain within natural regeneration limits for sustained long-term yields.

65. (C) Waterlogged and marshy areas, often in the Terai region
Vetiver grass, commercially known as Khus, is a hardy perennial grass species naturally thriving in low-lying, damp, and waterlogged habitats across river floodplains and Terai ecosystems. Its dense roots contain aromatic essential oils harvested through steam distillation, which form a major raw input for perfumery, cosmetics, and traditional cooling products.

66. (B) Eliminating middlemen to ensure fair baseline prices for gathered produce
Establishing Minimum Support Prices for minor forest produce provides a financial safety net for tribal gatherers. By fixing guaranteed minimum purchase rates across designated commodities, the policy protects primary collectors against market price fluctuations and exploitative intermediary practices, ensuring fair economic returns for gathered forest materials in rural markets.

67. (B) Providing alternative livelihoods to reduce local forest dependency
Eco-development programs operating around wildlife reserves focus on mitigating human-wildlife conflict and reducing unsustainable resource extraction. By offering alternative income options such as sustainable agriculture training, fuel-efficient cookstoves, livestock management, and local eco-tourism jobs, these initiatives lessen rural dependency on core habitats, encouraging local community participation in conservation efforts.

68. (A) II, I, III
Key historical legal and organizational developments in Indian forestry followed a specific timeline: the Indian Forest Act was enacted in 1927, the Uttar Pradesh Forest Corporation was established under state legislation in 1974, and the Scheduled Tribes and Other Traditional Forest Dwellers Rights Act was passed in 2006.

69. (D) Bandhavgarh National Park
Dudhwa National Park, Pilibhit Tiger Reserve, and Katarniaghat Wildlife Sanctuary are key protected areas located along the Terai belt within Uttar Pradesh's administrative boundary. Bandhavgarh National Park, however, is situated in Madhya Pradesh, renowned for its tiger populations and ancient fort landscape outside Uttar Pradesh's jurisdiction.

70. (A) Rope and paper manufacturing
Bhabar grass, naturally growing across the dry foot-slopes of the Shivalik and Terai belts, possesses high tensile strength and long cellulose fibers. These physical characteristics make it an essential raw material for rural rope twining enterprises, paper manufacturing plants, and artisanal cordage industries, providing stable economic support to regional forest communities.

71. (B) Income injections generating expanded local consumption and secondary economic activity
In economic analysis, the multiplier effect describes how initial financial investments in a sector stimulate secondary economic activity across connected industries. When forestry projects disburse wages to local workers or procure goods from village vendors, that money recirculates through local markets, expanding employment and boosting overall economic growth throughout rural communities.

72. (B) Lowering groundwater tables, impacting nearby crop yields
Establishing fast-growing monoculture tree plantations like Eucalyptus in arid zones can cause hidden ecological costs. Due to deep root architecture and high water absorption rates, these trees can deplete local groundwater resources. This lowered water table harms adjacent farm crops, creating negative economic externalities for rural agricultural communities.

73. (D) I, II, and III
Forest ecosystems serve as primary terrestrial carbon sinks by absorbing carbon dioxide during photosynthesis. Trading verified carbon credits monetizes this climate mitigation service. While mature forests store vast cumulative carbon stocks, rapidly growing young tree plantations sequester atmospheric carbon at faster annual

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afforestation, forest restoration, and sustainable land management initiatives worldwide.

93. (B) Reducing reservoir storage capacity, lowering power generation and irrigation
Catchment forest degradation increases soil erosion, washing high sediment loads into river systems and downstream reservoirs. Reservoir siltation reduces overall water storage capacity over time. This storage loss directly lowers hydroelectric power generation potential, reduces available agricultural irrigation water, and increases operational maintenance expenditures for clearing dam infrastructure.

94. (B) I and II only
Mangroves serve as breeding grounds and nurseries for marine organisms while supplying valuable fuelwood and timber to coastal communities. Crucially, their dense root systems absorb wave energy, protecting coastal infrastructure during severe storms rather than increasing structural vulnerability, rendering statements indicating increased coastal infrastructure vulnerability inaccurate.

95. (C) Flowers
The Mahua tree holds immense socio-economic value for forest-dependent communities across northern and central India. Distict sugary pale yellow flowers drop naturally in large quantities during spring, collected extensively by rural families to produce traditional beverages, fermented drinks, organic sweeteners, and food products, generating critical seasonal income.

96. (B) Value of preserving forest genetic resources for potential future medical cures
Option value represents the economic worth placed on preserving a natural resource for potential future uses, rather than exploiting it immediately. Protecting pristine forest ecosystems and their diverse genetic pool preserves options for discovering future pharmaceutical compounds, novel agricultural crops, or industrial biochemicals as scientific capabilities expand over time.

97. (A) SDG 1
Sustainable Development Goal 1 focuses on eradicating poverty across global populations. The forest economy directly contributes to this objective by providing accessible wage employment, supporting non-timber produce gathering, supplying smallholder agroforestry income, and building resilient community assets, directly strengthening financial security for vulnerable rural households worldwide.

98. (B) Nepal
The Terai Arc Landscape forms a continuous ecological and geographic zone stretching across the Himalayan foothills along the international border between northern India and Nepal. In Uttar Pradesh, this landscape encompasses critical wildlife habitats like Dudhwa and Pilibhit, forming an important wildlife corridor and driving international eco-tourism development.

99. (B) Distributing forest harvest revenues equitably among local villagers
Under Joint Forest Management framework agreements, village-level Forest Committees organize local residents to protect adjacent forest compartments against illegal logging and forest fires. In return for protection efforts, these committees manage the distribution of permitted non-timber forest produce and divide agreed revenue shares from commercial timber sales equitably among community members.

100. (B) Rill method
The Rill method is a scientific technique developed for tapping pine resin without causing structural damage to trees. By making shallow, uniform surface channels rather than deep axe cuts, it allows steady resin flow while preserving cambium tissue health, extending tree tap life and maintaining long-term commercial yields.

101. (B) TRIFED
Operating under the Ministry of Tribal Affairs, the Tribal Cooperative Marketing Development Federation of India works to improve the economic conditions of indigenous communities. TRIFED organizes marketing networks, sets up fair procurement centers, offers capacity training, and implements support prices for minor forest produce to prevent middleman exploitation.

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102. (B) REDD+
REDD+ is an international climate framework established under United Nations climate negotiations. It creates financial incentives for developing nations to reduce atmospheric emissions by halting deforestation, preventing forest degradation, conserving standing timber stocks, managing forests sustainably, and

83. (A) II, IV, I, III
The paper manufacturing value chain follows a systematic industrial sequence. It begins with timber felling and debarking in forest plantations, followed by log transport to paper mills. Raw wood then undergoes mechanical or chemical pulping, before the processed pulp is converted into continuous paper sheets and commercial paper rolls.

84. (C) I, II, and III only
Public-Private Partnerships in forestry mobilize corporate investments and modern silvicultural techniques to restore degraded lands, though balancing commercial returns with local land rights remains challenging. However, claiming these partnerships guarantee zero ecological impact on natural ecosystems is false, as commercial monoculture plantations can alter local ecological balances.

85. (B) Diversifying income through timber, fodder, and crop yields to buffer market risks
Integrating tree planting with seasonal agricultural cropping under agroforestry systems offers major economic advantages to farmers. Combining short-term crop harvests with medium and long-term timber or fruit sales diversifies income streams, protects farm households against agricultural market fluctuations or climate shocks, and improves overall land productivity.

86. (C) Maximum visitor volume sustained without environmental degradation
Ecotourism carrying capacity defines the maximum level of visitor use an ecosystem can support without causing long-term environmental degradation or lowering visitor satisfaction. Establishing this threshold allows park administrators to prevent habitat disturbance, manage visitor traffic, protect wildlife behavioral patterns, and maintain destination value for long-term ecotourism operations.

87. (C) CAMPA (Compensatory Afforestation Fund Management and Planning Authority)
When forest lands are assigned to non-forest developmental uses under legal frameworks, project developers must pay designated net present value and compensatory afforestation charges. These funds are credited into the statutory Compensatory Afforestation Fund, managed directly by CAMPA to finance state-level afforestation, wildlife protection, and ecological restoration projects.

88. (B) Promoting domestic wood manufacturing and handicraft value addition
Banning raw round log exports is an intentional trade policy designed to retain raw timber within the country. This restriction ensures reliable raw material supplies for domestic wood processing units, furniture makers, and handicraft industries. This policy captures processing value additions locally, expands domestic skilled employment, and exports higher-value finished goods.

89. (A) Mulberry plant leaves
The traditional sericulture industry relies directly on growing specific food plants to sustain silk-producing silkworms. Mulberry leaves serve as the essential feed for Bombyx mori silkworms during natural raw silk production. Cultivating mulberry plantations supports rural sericulture, creating home-based processing employment and supplementary income for farming households.

90. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Traditional gross domestic product calculations undercount the true economic contribution of forests because national accounts focus primarily on recorded timber sales. Critical ecosystem services like microclimate control, soil protection, watershed regulation, and unrecorded non-timber produce gathering are omitted from standard financial metrics, understating the overall economic contribution of forests.

91. (A) P-2, Q-3, R-1, S-4
Specific forest inputs support traditional regional cottage industries. Tendu leaves are harvested for wrapping bidis. Semal wood provides soft timber for match splint manufacturing. Sabai grass serves as natural fiber for paper production, while the heartwood of the Khair tree yields processed extracts for traditional Katha production.

92. (B) Platforms where entities voluntarily buy carbon credits from forestry projects
Voluntary carbon markets enable corporations, individuals, and non-governmental entities to purchase verified carbon credits voluntarily to offset their carbon emissions. These market platforms operate independently of statutory compliance mandates, directing private finance into carbon offset projects including

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rates, making all three statements scientifically accurate within forest economics.

74. (B) Value of a standing tree prior to felling, paid for harvesting rights
Stumpage value represents the economic net value of standing trees before harvesting operations occur. It is calculated as the final market value of harvested timber minus all operational expenses related to logging, transportation, and processing. Timber buyers pay stumpage fees to land owners or state forestry departments to secure harvesting rights.

75. (B) Integrating cultivation, processing, and marketing to achieve economies of scale
The National Bamboo Mission promotes industrial bamboo clusters to connect primary growers directly with processing hubs and distribution channels. By integrating raw material cultivation, primary processing, product design, and bulk marketing within designated regions, this approach reduces logistical expenses, improves product quality, and achieves substantial economies of scale.

76. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Forestry operations offer effective rural poverty reduction opportunities because tasks like sapling nursery management, planting, non-timber produce harvesting, and primary processing require high labor inputs with minimal starting capital. Consequently, marginalized and resource-poor rural households can readily participate in these activities to secure reliable supplementary household income.

77. (C) CITES (Convention on International Trade in Endangered Species)
The Convention on International Trade in Endangered Species of Wild Fauna and Flora is an international treaty designed to prevent cross-border trade from threatening species survival. It regulates global trade in timber species like Red Sanders through strict permit systems and trade quotas, protecting endangered wild flora from commercial over-exploitation worldwide.

78. (B) Serving as a gene pool for discovering active drug compounds
Natural forest biomes contain diverse wild plant species that serve as vital genetic repositories for pharmaceutical innovation. Phytochemicals extracted from wild forest flora lead to breakthroughs in synthetic medicine, providing active chemical templates for developing targeted treatments. This genetic diversity provides essential indirect value to global pharmaceutical research and development.

79. (B) Preserving local biodiversity vital for agriculture and traditional medicine
Sacred groves are communally protected natural forest patches preserved through traditional cultural beliefs. Beyond their spiritual importance, these groves serve as vital biodiversity reserves. They protect rare endemic flora, preserve natural medicinal plant species, shelter beneficial insect pollinators, and conserve micro-watersheds, indirectly supporting local agricultural production and traditional community healthcare.

80. (B) It solely focuses on the conservation of tigers without any commercial activities.
The Uttar Pradesh Forest Corporation was established in 1974 as a state statutory commercial body. Its principal responsibilities include scientific timber logging, depot management, marketing forest produce, and expanding eco-tourism ventures. Describing the corporation as solely focused on tiger conservation without commercial operations is incorrect regarding its statutory economic mandate.

81. (C) Foregone economic benefits from alternative land uses like agriculture or mining
Opportunity cost represents the foregone economic benefits resulting from choosing one resource allocation over another. When land is set aside as a protected wildlife sanctuary, its opportunity cost equals the potential income lost by declining alternative land uses, such as commercial agriculture, industrial development, timber logging, or mineral extraction operations.

82. (B) Sal (Shorea robusta)
Sal timber is the premier economic hardwood species found across the moist deciduous belt and Terai tracts of Uttar Pradesh. Renowned for its structural density, termite resistance, and mechanical durability, Sal wood is widely utilized for heavy construction, railway sleepers, door frames, and heavy structural timber applications.

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enhancing forest carbon sinks through structured international compensation mechanisms.

103. (A) Real estate price differentials based on proximity to forest areas
The Hedonic Pricing Method quantifies the economic value of environmental amenities by examining price variations in surrounding commercial markets, particularly real estate. Property values near pristine forests, urban parks, or scenic natural landscapes often command price premiums, allowing economists to isolate and measure the economic value of local environmental amenities.

104. (C) Goods and Services Tax (GST) on electronic software
State forest department revenues originate from natural resource sales, ecosystem user fees, and regulatory penalties. These include timber royalties, non-timber produce sales, land lease fees from ecotourism operators, and fines for forestry violations. Taxes collected on software products fall under general tax systems, remaining separate from forestry accounts.

105. (B) I and III only
Forests supply plant raw materials for modern pharmaceuticals and natural fiber inputs like bamboo for cottage basket weaving. However, forestry accounts for a modest direct percentage of India's gross domestic product, making claims that over 70% of national GDP originates exclusively from the forestry sector factually inaccurate.

106. (A) The concurrent production of agricultural crops and forest trees on the same land
Agri-silviculture is an agroforestry practice involving the deliberate combination of agricultural crops and forest trees on the same land parcel. Farmers manage trees and seasonal crops together to optimize land productivity, protect topsoil, diversify farm output, and secure complementary timber, fodder, and crop incomes from a single farming enterprise.

107. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Amending the Indian Forest Act to exclude non-forest bamboo from the definition of trees eliminated restrictive transit pass requirements and felling permits for private lands. This regulatory deregulation empowered farmers to cultivate, harvest, and transport bamboo like a standard agricultural cash crop, significantly boosting private agroforestry and rural household incomes.

108. (A) Sitapur
Sitapur district in Uttar Pradesh is a historic industrial hub for plywood, veneer, and processed wood manufacturing. Its geographic proximity to the timber-rich Terai belt and widespread adoption of Poplar agroforestry on surrounding agricultural lands ensure steady raw material supplies for local wood processing and veneer manufacturing facilities.

109. (B) Coastal Mangroves / Estuaries
Coastal mangroves and estuarine ecosystems generate high economic value per hectare among global biomes. They deliver essential services including coastal storm protection, wave attenuation, sediment trapping, carbon storage, and critical breeding habitats for commercial fisheries, reducing artificial infrastructure costs while supporting regional coastal economies.

110. (B) Trade in NTFPs is entirely untaxed and completely unregulated by the state government.
Non-timber forest products provide crucial lean-season income for forest fringe communities, and local processing increases primary collector profit margins. However, claiming NTFP trade is completely untaxed and unregulated by state governments is inaccurate, as state agencies regulate transit passes, royalty payments, and procurement frameworks.

111. (A) I, III, II
According to official assessment data from the India State of Forest Report 2021, Madhya Pradesh possesses the largest total forest cover area in the country, followed by Arunachal Pradesh in second place, while Uttar Pradesh maintains a much smaller total forest cover area due to extensive agricultural plains.

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112. (B) Keeping timber harvest rates within natural regeneration capacity
Carrying capacity in sustainable forestry management defines the maximum resource harvesting rate an ecosystem can sustain without degrading its long-term regenerative capacity. Managing timber harvests within natural regeneration thresholds ensures perpetual yields, maintains ecosystem stability, and prevents

enables governments to integrate natural capital into macroeconomic performance calculations alongside traditional financial indicators.

55. (A) P-3, Q-4, R-2, S-1
Key forestry institutions manage distinct operational domains. TRIFED supports tribal marketing of non-timber produce. UPFDC conducts commercial harvesting and auctioning of timber in Uttar Pradesh. CAMPA oversees compensatory afforestation funds collected during forest diversions, while ICFRE directs national forestry education, scientific research, and technological developments.

56. (B) I, II, and IV only
Sustainable ecotourism relies on varied commercial models including public-private partnerships, local community revenue sharing, and village homestays that decentralize economic benefits. However, ecotourism relies directly on financial transactions like entry fees, guiding charges, and local handicraft sales, making the idea that financial transactions are strictly prohibited within protected areas incorrect.

57. (B) Serving as a Cocoa Butter Equivalent in cosmetics and chocolate making
Fat extracted from Sal tree seeds possesses physical and chemical characteristics, including melting profiles, that closely mirror natural cocoa butter. Consequently, Sal seed oil is commercially purified and utilized as a cocoa butter substitute in chocolate manufacturing and as a primary moisturizing base ingredient across high-end cosmetic and pharmaceutical products.

58. (C) Finished wooden handicrafts and furniture
To support domestic manufacturing while discouraging raw timber exploitation, trade policies prohibit or strictly quota the export of raw logs like Red Sanders or Sandalwood. Conversely, fully finished value-added products like wooden furniture and intricate handicrafts face fewer export restrictions, encouraging domestic artisanal value addition and foreign currency earnings.

59. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Standard national output metrics measure economic production without accounting for natural capital depletion or environmental pollution costs. Green GDP corrects this distortion by deducting environmental damage expenses and resource depletion costs from overall figures. This adjusted valuation delivers a comprehensive, realistic measurement of a country's genuine long-term economic stability and sustainability.

60. (B) Diverting forest land for non-forest uses under conservation laws
Net Present Value calculations are legally mandatory in India when forest areas are cleared for development projects like mining or highways. The project proponent must pay the calculated NPV into CAMPA funds. This payment monetizes lost ecosystem services, timber value, and ecological functions over decades, financing equivalent afforestation elsewhere.

61. (A) Timber (Roundwood)
Forest economic produce is classified into major and minor categories based on source and usage. Major forest produce consists exclusively of timber, including round logs, structural poles, and fuelwood. Minor forest produce includes all non-timber items such as wild honey, tendu leaves, resin, gums, and medicinal herbs collected from forest ecosystems.

62. (B) Van Dhan Yojana
The Pradhan Mantri Van Dhan Yojana targets tribal livelihood improvement by establishing grassroot Van Dhan Vikas Kendras. These centers group tribal gatherers into self-help clusters, providing capital, working facilities, and processing training. This institutional support enables primary gatherers to process raw minor forest produce locally, capturing higher commercial value in regional markets.

63. (B) Establishing forest nurseries and executing block plantations
Permissible works under the Mahatma Gandhi National Rural Employment Guarantee Act prioritize ecological conservation and land restoration. Program guidelines specifically allow labor-intensive forestry projects including establishing sapling nurseries, executing block plantations on public lands, constructing trenching systems, and building water conservation structures to support sustainable community natural asset development.

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122. (D) Lac
Industrial paper and pulp manufacturing relies on plant materials containing high cellulose fiber content, including bamboo, soft wood species like Eucalyptus, and long-fiber grasses like Sabai. Lac, conversely, is an animal resin secreted by scale insects, utilized in shellac, varnishes, and adhesives rather than paper pulp production.

123. (B) Processing raw herbs into packaged powders or extracts prior to sale
Value addition in the medicinal plant industry involves transforming raw gathered herbs into higher-value processed products. Primary processing steps like cleaning, drying, grinding, sorting, extracting, and hygienic packaging extend product shelf life, meet commercial quality standards, and command higher market prices than unprocessed raw plant materials.

124. (B) Higher flood frequency and increased downstream water treatment costs
Deforesting upper catchment basins degrades soil stability and alters natural hydrologic flow patterns. Without tree roots binding soil and canopies intercepting heavy rainfall, surface runoff increases, triggering flash floods and washing heavy sediment loads into river systems, which significantly increases municipal water treatment expenditures for downstream communities.

125. (B) Securing timber resources for the state through legal access restrictions
Establishing Reserved Forests under the Indian Forest Act created strict legal frameworks to protect valuable standing timber reserves for state utilization. By restricting unauthorized public access, grazing, and timber harvesting, the state secured long-term control over strategic timber assets required for infrastructure expansion and government revenue generation.

126. (B) Expenses to construct artificial infrastructure providing equivalent services
The Replacement Cost Method estimates the economic value of an ecosystem service by calculating the monetary expenditure required to replace it with artificial engineering infrastructure. For instance, the economic value of a forest's natural flood control is measured by the cost of constructing and maintaining concrete floodwalls and drainage systems.

127. (B) Certifying consumer goods meeting eco-criteria to promote sustainability
The Government of India introduced the Eco-mark labeling scheme to certify consumer products that meet specific ecological criteria alongside statutory quality standards. By encouraging manufacturers to adopt eco-friendly production methods and helping consumers identify sustainable goods, the scheme promotes environmental protection and sustainable resource consumption across national markets.

128. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Promoting fast-growing agroforestry trees like Poplar and Eucalyptus on agricultural field boundaries provides farmers with short-rotation cash crops. This supplemental wood production meets commercial timber demand, generates regular farm income, and reduces logging pressure on natural forests, aligning agricultural support with ecological conservation objectives.

129. (A) I, II, IV, III
Implementing a REDD+ project follows a structured sequence. Developers first establish baseline forest carbon stocks across the project zone. They then execute afforestation and protection activities to enhance carbon storage. Independent auditors monitor and verify carbon stock gains, enabling the project to receive financial compensation through carbon credit issuances.

130. (B) Raising public awareness and participation in tree planting activities
Initiated in 1950, Van Mahotsav is an annual national tree-planting festival held across India during the early monsoon season. The campaign aims to raise public environmental awareness, promote afforestation, and encourage community participation in planting native trees across farm lands, schools, public areas, and degraded forest sites nationwide.

131. (A) Mulberry (Morus alba)
Wood derived from Mulberry trees possesses excellent elasticity, high impact resistance, and mechanical toughness, allowing it to bend under stress without fracturing. These structural qualities make it the premier choice for manufacturing high-quality sports goods, particularly hockey sticks, tennis rackets, and

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specialized gymnasium equipment produced in regional manufacturing clusters.

132. (B) I and II only
The National Working Plan Code establishes standardized procedures for drafting forest management plans across all Indian states. It mandates assessing non-timber forest produce and ecosystem services alongside traditional timber yields. Because economic sustainability and yield management form central components of working plans, saying the code completely ignores economics is false.

133. (B) Managing commercial logging and timber marketing operations independently
State Forest Development Corporations were created to separate commercial harvesting operations from statutory regulatory enforcement. Operating as commercial state enterprises, these corporations execute planned logging operations, run government timber depots, handle forest produce processing, and manage public auctions, ensuring transparent revenue generation and organized raw material distribution.

134. (A) Jigat powder (Machilus bark)
Jigat powder, prepared from the ground inner bark of Machilus macrantha trees, serves as an indispensable natural adhesive binder in the incense stick (agarbatti) manufacturing industry. Its sticky glutinous properties hold aromatic charcoal and fragrant plant pastes securely onto central bamboo sticks during production, making it economically valuable.

135. (B) Disbursing direct ex-gratia monetary compensation to victims
Human-wildlife conflict inflicts significant financial losses on rural communities through crop destruction, livestock predation, property damage, and loss of life. To mitigate rural hardship and maintain public support for conservation, state forest departments disburse direct ex-gratia financial compensation to affected farmers to help offset these economic losses.

136. (D) Turpentine oil
Taxol, Quinine, and Sarpagandha extract are bioactive chemical compounds isolated from forest plants and utilized directly in manufacturing pharmaceutical medicines to treat human diseases. Turpentine oil, derived by distilling pine resin, is an industrial solvent used in paints, varnishes, and chemical manufacturing rather than a direct therapeutic pharmaceutical.

137. (B) Agro-forestry combines trees with farm crops, while social forestry plants community lands
Agroforestry focuses on integrating multi-purpose tree species with agricultural crops or livestock directly on privately owned farm lands. Social forestry, broadly conceived, involves establishing tree plantations on public, communal, or roadside lands to meet community fuelwood, fodder, and small timber needs while supporting local eco-restoration efforts.

138. (B) Sustainable forest management verification yielding premium market prices
Independent forest certification frameworks, such as the Forest Stewardship Council, verify that timber products originate from sustainably managed forests that meet strict ecological and social criteria. Certification grants wood processing businesses access to environmentally conscious international markets, where certified products command price premiums and secure long-term buyer contracts.

139. (A) P-2, Q-3, R-1
Distinct forest types correspond to specific geographic and climatic zones across Uttar Pradesh. Tropical moist deciduous forests thrive along the humid Terai and Bhabar belts. Tropical dry deciduous forests cover the central and eastern plains, while tropical thorn scrub forests predominate in the drier southwestern districts near Rajasthan.

140. (C) Assertion (A) is true but Reason (R) is false.
India records a trade deficit in its forest sector because domestic wood production falls short of total consumption, forcing high volume imports of raw industrial round logs and wood pulp. The claim that India primarily exports raw logs while importing cheap wood products is false, as national trade policies actively promote value-added finished exports.

141. (C) 2022
To expand its eco-tourism potential and coordinate environmental tourism projects, Uttar Pradesh approved establishing the comprehensive Uttar Pradesh Eco-Tourism Development Board in 2022. This centralized board coordinates

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multi-departmental efforts to expand green infrastructure, protect wildlife reserves, and generate local eco-tourism employment across protected state landscapes.

142. (A) I and II only
State transit rules mandate that specified timber and forest produce moving across public roads carry valid transit passes to prevent illegal logging and timber smuggling. However, transit rules focus exclusively on forest timber and specified non-timber produce, without restricting or prohibiting the transportation of standard agricultural food grains.

143. (B) Food, pharmaceutical, and cosmetics production
Gum Karaya, extracted from Sterculia urens trees found across dry deciduous forests, possesses natural emulsifying, thickening, and stabilizing properties. These functional characteristics make it a high-value input across processing industries, widely utilized in manufacturing specialized pharmaceuticals, laxatives, denture adhesives, food stabilizers, and cosmetic formulations.

144. (B) Incorporating resource depletion into national economic accounts for sustainable metrics
The primary objective of calculating Green GDP is to adjust traditional national income metrics by deducting costs associated with environmental degradation, biodiversity loss, and natural resource depletion. This comprehensive accounting framework provides policymakers with realistic measures of sustainable economic growth, ensuring natural capital consumption is recognized in development policy.

145. (A) Butea monosperma (Palash) and Shorea robusta (Sal)
Traditional leaf plate (Pattal) and bowl (Dona) cottage enterprises across northern and central India rely on harvesting tough, broad leaves from Butea monosperma (Palash) and Shorea robusta (Sal) trees. Collecting, drying, and stitching these leaves provides supplementary seasonal income for rural women and forest fringe households.

146. (B) Complexities of land tenure, community rights, and forest ownership laws
Establishing Public-Private Partnerships in the forestry sector faces complex regulatory challenges. Managing long-term land tenure security, protecting legal community land rights under the Forest Rights Act, and balancing private commercial profit goals with public conservation mandates create significant legal and administrative hurdles for attracting private forestry investments.

147. (A) Enabling future farmer participation in voluntary carbon credit markets
The Sub-Mission on Agroforestry encourages farmers to plant tree species alongside agricultural crops. Beyond supplying timber and fodder, standing farm trees accumulate biomass carbon over time. This carbon accumulation enables farming communities to participate in emerging voluntary carbon markets, generating supplementary carbon credit revenues alongside traditional agricultural output.

148. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Preserving and restoring natural forest cover offers a cost-effective alternative to building concrete flood defenses for disaster risk reduction. Intact forest canopies and root systems absorb excess rainfall, stabilize soil slopes, recharge aquifers, and buffer storm flows, providing sustainable, low-cost protection against landslides and floods.

149. (B) Bareilly
Bareilly district in Uttar Pradesh is historically famous for its processing hubs for Katha extraction from Khair wood and its traditional cane furniture manufacturing. Abundant natural raw material supplies from adjacent forest areas and established artisanal clusters have made Bareilly a recognized regional center for these specialized forest-based cottage industries.

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150. (B) Sequential stages from raw material harvest to retail sale adding product value
A value chain encompasses the complete sequence of operations required to transform a raw material into a final consumer product. For forest goods, this sequence includes gathering, primary grading, transportation, industrial refining, protective packaging, distribution, and final retail sales, with each stage adding commercial economic value to the item.

151. (B) I, II, and IV only
State forest departments manage forestry operations by enforcing Working Plans, engaging local workers in afforestation projects, and auctioning timber and confiscated produce.

CHAPTER 14
Forest Ecology

1. Which of the following best defines forest ecology?
(A) The study of the economic valuation of timber and non-timber forest products
(B) The study of the scientific interactions between organisms and their environment within a forest ecosystem
(C) The administrative management of forest land to maximize financial returns
(D) The mapping of forest boundaries for legal and territorial demarcation

2. Why is the ecological study of forests considered essential for sustainable forest management?
(A) It provides methods to eradicate all wild herbivores to protect timber species
(B) It focuses solely on replacing natural forests with fast-growing monoculture plantations
(C) It eliminates the need for any human intervention in forest areas
(D) It helps in understanding nutrient cycling and species interdependence to maintain ecosystem resilience

3. In the global classification of forests, which biome is characterized by broad-leaved trees that shed their leaves seasonally to conserve water?
(A) Deciduous Forest
(B) Tropical Rainforest
(C) Temperate Coniferous Forest
(D) Boreal Forest

4. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): Tropical rainforests have the highest biodiversity among terrestrial ecosystems.
Reason (R): These forests experience high temperatures and heavy rainfall uniformly throughout the year, providing optimal conditions for continuous vegetative growth.
(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

5. Which of the following is a primary characteristic of temperate forests compared to tropical forests?
(A) They have distinct seasonal changes with a defined winter
(B) They possess far greater species diversity than rainforests
(C) They lack a well-defined canopy layer across all seasonal strata
(D) They are typically found in low-latitude equatorial regions

6. Match List I with List II and select the correct option.
List I: Global Forest Type
P. Taiga
Q. Tropical Rainforest
R. Mediterranean Forest
S. Savanna Woodland
List II: Key Characteristic
1. Wet winters and dry summers
2. Dominated by coniferous trees like pine and spruce
3. Continuous dense canopy with high rainfall
4. Open tree canopy with a continuous grass understory
(A) P-3, Q-2, R-4, S-1
(B) P-2, Q-1, R-3, S-4
(C) P-1, Q-4, R-2, S-3
(D) P-2, Q-3, R-1, S-4

7. The Champion and Seth classification (1968) categorizes Indian forests primarily on the basis of which factors?
(A) Exclusively on the basis of soil types
(B) Climate, topography, soil, and past treatments
(C) Only on altitudinal variations
(D) Exclusively on the distribution of wildlife species

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Affairs, supported by technical evaluations from TRIFED. Pricing decisions analyze market trends, labor efforts, processing requirements, and baseline collection expenses to establish fair floor prices that protect primary tribal gatherers from market exploitation.

162. (C) Paying daily wages to a tribal laborer under MGNREGA for planting trees
The Polluter Pays Principle mandates that entities causing environmental damage bear the costs of remediation or mitigation, as seen in NPV levies, compensatory afforestation fees, and pollution fines. Disbursing wages to rural laborers for tree planting is a social welfare and environmental restoration expenditure, making it the odd entry.

163. (B) Fostering community ownership, curbing illegal logging, and sharing forest revenue
Joint Forest Management improves the rural forest economy by establishing formal partnerships between local village committees and state forest authorities. Involving local residents in forest protection curbs illegal logging and forest fires, while providing communities with legal access to non-timber produce and a share of final timber harvest revenues.

164. (B) Causes timber/NTFP losses, fire fighting costs, and severe ecosystem damage
Uncontrolled forest fires cause significant economic damage across state forestry sectors. Wildfires destroy standing timber stocks, burn valuable non-timber resources, harm natural regeneration, damage local biodiversity, and require substantial operational expenditures for fire suppression, while impairing long-term ecosystem service generation across affected watersheds.

165. (A) I, II, and III only
Mangrove biomes provide vital coastal economic benefits by serving as breeding grounds for commercial fisheries, supplying durable timber for boat construction, and buffering coastal infrastructure against destructive storm surges. Asserting that mangroves are completely devoid of commercially viable flora or fauna is factually incorrect.

166. (B) Lalitpur / Jhansi
Southern districts of Uttar Pradesh like Lalitpur and Jhansi contain extensive dry deciduous forests rich in Tendu trees. The widespread availability of Tendu leaves supports a vibrant cottage bidi rolling industry across these rural districts, generating key off-season employment and financial support for marginalized local households.

167. (C) Assertion (A) is true but Reason (R) is false.
Uttar Pradesh possesses substantial untapped ecotourism potential across its diverse landscapes, including tiger reserves, wetlands, and bird sanctuaries. The claim that the state lacks wildlife sanctuaries and natural forest cover is completely false, as reserves like Dudhwa, Pilibhit, and Ranipur protect rich natural habitats and wildlife populations.

168. (B) Divisional Forest Officer (DFO) / Deputy Conservator of Forests (DCF)
At the territorial forest division level, the Divisional Forest Officer, or Deputy Conservator of Forests, serves as the principal executive officer. The DFO oversees day-to-day forest administration, enforces working plan prescriptions, supervises timber harvesting depot operations, conducts produce auctions, and collects state forestry revenues across the division.

169. (B) Convergence with CAMPA funds and the MGNREGA scheme
The National Mission for a Green India secures operational funding by combining direct budgetary allocations with existing public funds, primarily through convergence with CAMPA funds and the MGNREGA scheme. This integrated financial framework supports large-scale afforestation, eco-restoration, and rural livelihood support without imposing direct environmental taxes on local agricultural populations.

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170. (B) Forest management (SDG 15) supports poverty reduction (SDG 1) and growth (SDG 8)
The Sustainable Development Goals form an interconnected policy framework where sustainable terrestrial forest management directly supports broader socioeconomic objectives. Protecting and restoring forest ecosystems provides rural employment, secures non-timber produce income, and protects watershed services, directly driving poverty alleviation, economic growth, and environmental sustainability across regions.

However, regulating heavy industrial machinery prices falls under industrial commerce agencies, remaining completely outside the administrative mandate and operational duties of state forest management institutions.

152. (B) National Bamboo Mission
The National Bamboo Mission was established to drive growth across the bamboo sector through a cluster-based development approach. By integrating farm production, establishing processing units, upgrading traditional artisan skills, and building market linkages, the mission unleashes bamboo's economic potential as a versatile material for construction, handicrafts, and green industries.

153. (B) GDP focuses on recorded timber, ignoring unrecorded NTFPs and ecosystem services
Traditional gross domestic product metrics record primarily formal commercial timber harvests and official forest fees, leaving the forestry sector's share under 2%. Unrecorded non-timber produce gathering, informal trade, and critical ecosystem services like water purification and soil conservation are omitted from standard calculations, understating the sector's true economic contribution.

154. (B) Conventional GDP rises, while Green GDP falls due to natural capital loss
Felling and selling an entire forest reserve in a single year generates high immediate market revenue, causing standard gross domestic product figures to rise temporary. Conversely, Green GDP calculations subtract the immense natural capital loss and ecological damage caused by clear-felling, causing the adjusted green metric to decline sharply.

155. (A) P-3, Q-2, R-4, S-1
Standard terms in forest economics define specific financial transactions. Royalties represent statutory fees paid to governments for extracting natural resources. Ex-gratia payments provide monetary relief to human-wildlife conflict victims. Seigniorage reflects net estate revenues, while stumpage defines the monetary value paid for standing timber harvesting rights.

156. (B) Managing local eco-tourism and directing revenue shares to community development
Eco-Development Committees organize local fringe communities around wildlife reserves to participate directly in conservation efforts. In ecotourism management, these committees manage local tourism services, collect designated fee percentages, and direct earned revenue shares into village welfare projects, reducing community reliance on core forest exploitation.

157. (B) Recharging groundwater aquifers to sustain local agricultural tube-well irrigation
Forest canopies and natural leaf litter improve water infiltration into upper soil layers, reducing rapid surface runoff and recharging regional groundwater aquifers across adjacent plains. This hydrological regulation sustains local groundwater levels, ensuring stable water supplies for agricultural tubewell irrigation during dry cropping seasons.

158. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Easing transit permit regulations and removing price restrictions on common agroforestry tree species simplifies tree harvesting and transportation for farmers. Reducing regulatory burdens encourages agricultural landowners to adopt farm forestry, increasing domestic wood supplies, supporting regional wood industries, and diversifying rural farming incomes.

159. (A) I and II only
India imports substantial quantities of pulp and paper products to cover domestic supply deficits, while maintaining strong exports of value-added wooden handicrafts. To meet wood industry raw material needs, the government permits industrial round log imports under low tariff structures, making statements asserting complete log import bans incorrect.

160. (B) The carbon sequestered and the flood mitigation provided by the forest
Regulating services encompass the natural regulatory functions provided by intact ecosystems. Economic valuations of these services quantify benefits such as atmospheric carbon sequestration for climate stabilization, soil retention, water filtration, and natural flood control, rather than direct commercial products like harvested timber logs or gathered honey.

161. (B) Fixed by Tribal Affairs based on TRIFED pricing recommendations and collection costs
The Minimum Support Price for minor forest produce is fixed by the Ministry of Tribal

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8. Under the Champion and Seth classification, Indian forests are divided into how many major type groups?
(A) 5
(B) 10
(C) 16
(D) 21

9. Consider the following statements regarding the importance of studying forest ecology:
I. It aids in climate change mitigation by understanding carbon sequestration potential.
II. It helps in formulating strategies to control invasive alien species.
III. It facilitates the conversion of natural forests into agricultural lands efficiently.
Which of the above statement(s) is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

10. According to the Champion and Seth classification, which forest type occupies the largest percentage of the total forest area in India?
(A) Tropical Dry Deciduous Forests
(B) Tropical Moist Deciduous Forests
(C) Tropical Evergreen Forests
(D) Himalayan Moist Temperate Forests

11. Which major forest type is predominantly found in the Terai region of Uttar Pradesh?
(A) Tropical Dry Evergreen Forests
(B) Tropical Moist Deciduous Forests
(C) Alpine Scrub
(D) Tropical Thorn Forests

12. Sal (Shorea robusta) is a climax species predominantly associated with which type of forest in Uttar Pradesh?
(A) Tropical Thorn Forests of dry regions
(B) Tropical Moist Deciduous Forests
(C) Sub-tropical Pine Forests of hills
(D) Montane Wet Temperate Forests

13. The Bundelkhand region of Uttar Pradesh is primarily characterized by which of the following forest types?
(A) Tropical Dry Deciduous and Thorn Forests
(B) Tropical Moist Deciduous and Wetland Forests
(C) Littoral, Mangrove, and Swampy Forest Types
(D) Sub-tropical Broadleaved Hill Forest Vegetation

14. Which of the following tree species is least likely to be found naturally occurring in the plains of Uttar Pradesh?
(A) Neem (Azadirachta indica)
(B) Shisham (Dalbergia sissoo)
(C) Deodar (Cedrus deodara)
(D) Mahua (Madhuca longifolia)

15. Arrange the following structural layers of a mature tropical forest from the highest elevation to the ground level:
I. Understory layer
II. Emergent layer
III. Forest floor
IV. Canopy layer
(A) II, IV, I, III
(B) IV, II, I, III
(C) II, I, IV, III
(D) IV, I, III, II

16. In forest stratification, the term "Canopy" refers to which part of the ecosystem?
(A) The bottom soil surface layer where fallen leaves accumulate
(B) The deep subterranean layer containing plant root systems
(C) The continuous layer formed by the crowns of tall trees
(D) The sparse understory vegetation layer near ground level

17. Which structural layer of a forest receives the least amount of sunlight?
(A) Emergent layer
(B) Forest floor
(C) Canopy layer
(D) Understory layer

18. Plants growing on other plants for physical support without drawing nutrients from them, commonly found in dense forest canopies, are called:
(A) Parasites
(B) Saprophytes
(C) Lithophytes
(D) Epiphytes

19. Consider the following statements regarding the forests of Uttar Pradesh:
I. The Terai-Bhabar region supports tall grasses and Sal forests.

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(A) The overall change in nutrient holding capacity of topsoil
(B) The release of deeply trapped underground aquifer water
(C) The fraction of incident solar radiation reflected by Earth
(D) The physical reduction of continuous wildlife migration paths

41. How does widespread deforestation directly impact the hydrological cycle?
(A) It increases evapotranspiration rates, leading to substantially heavier local precipitation
(B) It decreases surface runoff rates while significantly boosting underground aquifer recharge
(C) It maintains hydrological equilibrium with virtually no measurable impact on local watersheds
(D) It lowers evapotranspiration, reducing regional rainfall and elevating surface runoff levels

42. Ecological fragmentation due to deforestation generally leads to which of the following?
(A) Increased edge effects and higher vulnerability of core species
(B) Substantial expansion and growth of deep interior forest habitats
(C) Enhanced gene flow and movement among isolated animal populations
(D) Complete eradication of invasive non-native plant species

43. Select the correct sequence of succession starting from bare rock (Xerarch succession):
(A) Bare rock → Lichens → Mosses → Annual herbs → Perennial grasses → Shrubs → Trees
(B) Bare rock → Trees → Shrubs → Lichens → Mosses → Herbs
(C) Bare rock → Shrubs → Annual herbs → Lichens → Trees
(D) Bare rock → Mosses → Trees → Lichens → Shrubs

44. What is the primary role of a riparian forest buffer in ecological hydrology?
(A) To maximize commercial timber harvesting output near major riverbanks
(B) To filter sediment and nutrient runoff before reaching water bodies
(C) To accelerate water flow velocity across surrounding agricultural fields
(D) To eliminate aquatic organisms and submerged vegetation completely

45. The dark, organic material in soils, produced by the decomposition of plant and animal matter, which is vital for retaining moisture and nutrients, is known as:
(A) Humus
(B) Regolith
(C) Bedrock
(D) Loess

46. The top layer of a typical forest soil profile, predominantly composed of organic matter like fallen leaves and twigs, is designated as the:
(A) A Horizon
(B) B Horizon
(C) O Horizon
(D) C Horizon

47. In the process of forest litter decomposition, the conversion of complex organic substances into simple inorganic forms (like ammonium and phosphate) by microorganisms is termed:
(A) Fragmentation
(B) Leaching
(C) Humification
(D) Mineralization

48. Which group of microorganisms plays the most critical role in the decomposition of tough, woody materials containing lignin in forest ecosystems?
(A) Nitrifying bacteria
(B) Cyanobacteria
(C) Fungi
(D) Actinomycetes

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49. Consider the following statements about forest canopy density classification:
I. Moderately Dense Forest has a canopy density of 40% to 70%.
II. Very Dense Forest has a canopy density exceeding 70%.
III. Open Forest has a canopy density of 10% to 40%.
IV. Scrub land has a canopy density of 20% to 30%.
Which of the above statement(s) is/are correct?
(A) I, II, and III only
(B) I, II, and IV only
(C) II, III, and IV only
(D) I, III, and IV only

tropical evergreen forest typically contains shade-tolerant plant species.
Reason (R): The thick upper canopy intercepts the majority of sunlight, reducing the light available for lower strata.
(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

30. The final, stable stage of ecological succession that remains in equilibrium with the local environment is known as the:
(A) Seral community
(B) Pioneer community
(C) Climax community
(D) Ecotone community

31. Which of the following best describes 'Hydrarch' succession?
(A) Ecological succession taking place on bare rock surfaces
(B) Ecological succession occurring in dry desert environments
(C) Ecological succession directly triggered by severe forest fires
(D) Ecological succession originating within an aquatic water body

32. According to the Forest Survey of India (FSI), 'Very Dense Forest' (VDF) is defined as lands with forest cover having a canopy density of:
(A) Between 10% and 40%
(B) Between 40% and 70%
(C) 70% and above
(D) Less than 10%

33. The Forest Survey of India assesses the forest cover of the country biennially primarily using which technology?
(A) Only ground-based ocular estimation
(B) Remote sensing via satellite imagery
(C) Drone-based visual counts
(D) Historical revenue records extrapolation

34. In forest cover measurement, areas with a tree canopy density of less than 10% are classified as:
(A) Moderately Dense Forest
(B) Open Forest
(C) Very Dense Forest
(D) Scrub

35. According to the India State of Forest Report (ISFR) 2021, what is the approximate geographical area of Uttar Pradesh under forest cover?
(A) 2.50%
(B) 6.15%
(C) 12.80%
(D) 21.67%

36. Consider the following statements regarding the carbon cycle in a forest:
I. Forests act as carbon sinks by absorbing carbon dioxide during photosynthesis.
II. Respiration by plants and soil microbes releases carbon dioxide back into the atmosphere.
III. Deforestation permanently increases the carbon sequestration capacity of the soil.
Which of the above statement(s) is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

37. Which district in Uttar Pradesh possesses the highest percentage of forest cover relative to its geographical area, as per the ISFR 2021?
(A) Sonbhadra
(B) Lakhimpur Kheri
(C) Pilibhit
(D) Mirzapur

38. Shifting cultivation (Jhumming) is a major anthropogenic cause of deforestation primarily practiced in which part of India?
(A) Western Himalayas
(B) Desert regions of Rajasthan
(C) Coastal plains of Kerala
(D) North-Eastern states

39. Which of the following is a direct natural cause of deforestation and forest degradation?
(A) Rapid urban development and major highway construction
(B) Widespread severe forest fires caused by lightning strikes
(C) Continuous expansion of agricultural frontiers and pastures
(D) Commercial mining operations and mineral extraction projects

40. The 'Albedo effect' altered by deforestation refers to:

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II. The Vindhyan region features dry deciduous forests.
III. Mangrove forests are widely distributed in the eastern districts of UP.
IV. Afforestation in ravine lands is carried out using species like Acacia.
Which of the above statement(s) is/are correct?
(A) I, II, and III only
(B) I, II, and IV only
(C) II, III, and IV only
(D) I, III, and IV only

20. Alpha diversity in a forest ecosystem refers to:
(A) The turnover of species composition between two distinct habitats
(B) The overall species diversity measured across a large region
(C) The species diversity within a specific local community
(D) The genetic variations found strictly within a single species

21. A species whose presence and role within a forest ecosystem has a disproportionately large effect on other organisms relative to its abundance is known as a:
(A) Keystone species
(B) Pioneer species
(C) Indicator species
(D) Invasive species

22. Which of the following factors is an abiotic component affecting forest productivity?
(A) Herbivory rate
(B) Soil microbial biomass
(C) Pollinator availability
(D) Precipitation patterns

23. Soil porosity in a forest ecosystem is crucial because it primarily dictates:
(A) The exact species of birds that will nest in the area
(B) Water retention capacity and root aeration
(C) The colour of the canopy leaves during autumn
(D) The albedo of the forest floor

24. Which essential macronutrient often acts as a limiting factor in forest soil productivity and is fixed by symbiotic bacteria in the roots of leguminous trees?
(A) Phosphorus
(B) Potassium
(C) Nitrogen
(D) Calcium

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25. Match List I with List II and select the correct option.
List I: Nutrient Cycle Type
P. Carbon Cycle
Q. Nitrogen Cycle
R. Phosphorus Cycle
S. Water Cycle
List II: Primary Reservoir
1. Atmosphere
2. Atmosphere (as N_2 gas)
3. Oceans and surface water
4. Sedimentary rocks
(A) P-2, Q-1, R-3, S-4
(B) P-4, Q-2, R-1, S-3
(C) P-1, Q-4, R-2, S-3
(D) P-1, Q-2, R-4, S-3

26. In the process of nutrient cycling in a forest, what is the role of detritivores?
(A) They decay organic matter to aid microbial decomposition
(B) They convert incoming solar energy into rich chemical energy
(C) They capture atmospheric nitrogen gas for absorption by plants
(D) They serve as essential primary pollinators for canopy flora

27. The natural, orderly, and predictable process of community change over time in an ecosystem, eventually leading to a stable community, is termed:
(A) Biomagnification
(B) Ecological succession
(C) Habitat fragmentation
(D) Eutrophication

28. Which of the following scenarios represents primary succession?
(A) Regeneration of mature forest vegetation after severe fires
(B) Primary plant growth on fresh volcanic lava flows
(C) Natural ecological recovery of abandoned agricultural land
(D) Secondary regrowth of timber stands following clear felling

29. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): The middle storey of a dense

50. The microclimate within a mature forest compared to an adjacent open field generally exhibits:
(A) Higher daytime maximum temperatures and lower humidity
(B) Greater wind speeds at ground level
(C) Higher extreme temperature fluctuations
(D) Lower daytime maximum temperatures and higher humidity

51. The "Edge Effect" in forest ecology usually results in:
(A) Environmental conditions favoring edge-adapted species
(B) Marked decline in species diversity across habitat boundary zones
(C) Microclimatic conditions identical to deep forest core interiors
(D) Total exclusion of invasive plant and animal species from boundaries

52. Mangrove forests exhibit unique ecological adaptations. What are pneumatophores?
(A) Specialized leaf glands that excrete excess salt from plant tissue
(B) Seeds that germinate while still physically attached to parent trees
(C) Aerial roots that enable gas exchange in anaerobic mangrove soils
(D) Stilt root structures primary adapted for trapping floating debris

53. The phenomenon of 'vivipary' is commonly observed in which type of forest ecosystem?
(A) Mangrove Forests
(B) Alpine Forests
(C) Tropical Dry Deciduous Forests
(D) Sub-tropical Pine Forests

54. Mangrove forests play a crucial role in coastal protection primarily by:
(A) Substantially boosting coastal wind speeds during severe tropical storms
(B) Accelerating the salinization of inland freshwater aquifers near coasts
(C) Removing sediment loads from major river outflows completely and permanently
(D) Attenuating wave energy from storm surges and reducing shoreline erosion

55. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): Deforestation in hilly catchments increases the frequency and severity of flash floods downstream.
Reason (R): The removal of forest cover decreases the water infiltration rate and soil binding capacity, leading to rapid surface runoff.
(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

56. The Himalayan forest ecology is highly sensitive. As one moves from the foothills to the higher elevations of the Himalayas, which structural sequence of vegetation is generally observed?
(A) Tropical moist deciduous → Sub-tropical pine → Temperate broadleaf → Alpine scrub
(B) Alpine scrub → Temperate broadleaf → Sub-tropical pine → Tropical moist deciduous
(C) Tropical moist deciduous → Alpine scrub → Sub-tropical pine → Temperate broadleaf
(D) Temperate broadleaf → Tropical moist deciduous → Alpine scrub → Sub-tropical pine

57. The "Timberline" or "Treeline" in the Himalayan ecosystem represents:
(A) The minimum elevation threshold where commercial forestry operates
(B) The geographic boundary separating tropical and subtropical zones
(C) The altitude mark above which permanent human settlements reside
(D) The upper elevation limit beyond which trees cannot survive

58. Which of the following tree species dominates the Sub-tropical Pine Forests of the lower Himalayas and is highly prone to forest fires?
(A) Chir Pine (Pinus roxburghii)
(B) Himalayan Oak (Quercus leucotrichophora)
(C) Terai Sal (Shorea robusta)
(D) Teak (Tectona grandis)

59. The Gangetic plain region of Uttar Pradesh naturally supported extensive Tropical Moist Deciduous Forests. Currently, these forests are mainly restricted to which tract?
(A) The central Gangetic Doab agricultural region
(B) The northern Terai and Bhabar forest tract

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139. Consider the following statements regarding conservation approaches:
I. In-situ conservation protects species in their natural habitats.
II. Ex-situ conservation includes botanical gardens and seed banks.
III. Captive breeding programs are considered an in-situ conservation method.
Which of the above statement(s) is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

140. Which of the following represents an ecological consequence of over-harvesting non-timber forest products (NTFPs) like seeds and fruits?
(A) Substantial exponential growth in standing forest biomass
(B) Reduced natural regeneration of harvested plant species
(C) Enhanced overall genetic diversity among surrounding trees
(D) Complete eradication of invasive weeds from forest floors

141. "Shelterbelts" are rows of trees planted primarily to:
(A) Creating windbreaks to protect fields from wind erosion
(B) Maximizing commercial timber production per planted hectare
(C) Trapping river floodwaters to construct artificial wetlands
(D) Providing exclusive movement corridors for large mammals

142. A sudden, massive outbreak of an insect defoliator in a forest is often a symptom of:
(A) An indicator of high ecosystem biodiversity and resilience
(B) A sign of optimal nutrient cycling equilibrium in soil
(C) Ecological imbalance from monocultures or climate stress
(D) An indicator of normal predator-prey population dynamics

143. Which of the following best defines the 'Carrying Capacity' of a forest for a particular wildlife species?
(A) The minimum population size required to avoid species extinction
(B) The total biological mass of a wildlife species in a given area
(C) The total physical land area available for animal movement
(D) The maximum population size a habitat can support sustainably

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144. In measuring forest biodiversity, what does the 'Shannon-Wiener Index' account for?
(A) The total number of individual plant species recorded
(B) The genetic diversity contained within a single species
(C) Both species richness and relative species evenness
(D) The overall carbon storage capacity of the ecosystem

145. Forest soils in humid tropical regions are generally:
(A) Deeply rich in organic nutrients throughout topsoil layers
(B) Highly acidic, heavily leached, and nutrient-poor
(C) Composed predominantly of unweathered parent bedrock
(D) Characterized by extensive subterranean permafrost layers

146. A "Pioneer Species" is characterized by its ability to:
(A) Requiring dense canopy shade for seed germination
(B) Outcompeting mature trees for limited soil nutrients
(C) Reproducing very slowly over multiple decades
(D) Tolerating harsh conditions to colonize barren land

147. Which group of plants is largely responsible for nitrogen fixation in the pioneer stages of primary succession?
(A) Lichens and cyanobacteria
(B) Epiphytic orchids and mosses
(C) Deciduous oak and maple trees
(D) Woody forest lianas and vines

148. Which factor is most responsible for determining the global distribution of the major forest biomes?
(A) Soil pH levels and mineral content
(B) Variations in atmospheric nitrogen gas concentration
(C) Regional temperature and precipitation

(D) Rapid improvements in spatial resolution of satellite forest maps

69. Invasive alien species often disrupt forest ecology by outcompeting native flora. Which of the following is a notorious invasive weed widely affecting Indian forests?
(A) Lantana camara
(B) Dalbergia sissoo (Shisham)
(C) Azadirachta indica (Neem)
(D) Ficus religiosa (Peepal)

70. Prosopis juliflora (Vilayati Babul) was historically introduced for afforestation but became invasive. It primarily dominates and alters the ecology of which region?
(A) Evergreen forests across the high rainfall Western Ghats
(B) High-elevation alpine pastures of the Himalayan range
(C) Coastal mangrove forest ecosystems of the Sundarbans Delta
(D) Arid and semi-arid tracts of Western and Central India

71. In the economic valuation of forest ecosystems, which of the following is considered an "Indirect Use Value"?
(A) Timber extracted for residential building construction
(B) Carbon sequestration and atmospheric regulation
(C) Fuelwood gathered regularly by local rural communities
(D) Medicinal herb species harvested for commercial trade

72. The "Existence Value" of a forest ecosystem refers to:
(A) Commercial market value of standing timber reserves if harvested
(B) Financial revenue generated through eco-tourism entry fee collections
(C) Value from knowing a forest exists without personal utilization
(D) Statutory financial compensation mandated for forest land diversion

73. Which scientific approach involves assisting the natural recovery of degraded forest areas by protecting them from grazing, fire, and human interference without resorting to massive plantation?
(A) Clear-felling silvicultural harvest methods
(B) Agroforestry integration in farm lands
(C) Industrial monoculture tree plantations
(D) Assisted Natural Regeneration methods

74. Joint Forest Management (JFM) is an approach to forest conservation that fundamentally relies on the partnership between:
(A) State forest departments and local village communities
(B) Central government agencies and international conservation bodies
(C) Private timber corporations and commercial wood processing plants
(D) Scientific research institutions and organized wildlife advocacy groups

75. Arrange the stages of forest litter decomposition in the correct chronological order:
I. Humification
II. Fragmentation
III. Mineralization
IV. Leaching
(A) II, IV, I, III
(B) II, I, IV, III
(C) IV, II, I, III
(D) I, II, III, IV

76. In an undisturbed forest ecosystem, the Pyramid of Energy is always:
(A) Inverted
(B) Upright
(C) Spindle-shaped
(D) Bell-shaped

77. Which of the following relationships describes 'Mycorrhizae' in a forest ecosystem?
(A) Symbiosis between fungi and vascular plant roots
(B) Parasitism between climbing vines and host tree trunks
(C) Interspecific competition among canopy tree species
(D) Predatory behavior exhibited by insectivorous flora

78. Epiphytic orchids found in moist forest canopies are classic examples of which type of ecological interaction?
(A) Mutualistic symbiosis
(B) Amensalistic interaction
(C) Commensalism
(D) Parasitic interaction

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(A) The forest releases more carbon into the air than it absorbs
(B) The forest maintains exact carbon balance with zero net flux
(C) The forest area is completely converted into farm fields
(D) The forest absorbs more carbon from air than it releases

99. Consider the following statements regarding the Terai ecosystem of Uttar Pradesh:
I. It is characterized by a high water table and marshy conditions.
II. It supports dense, tall elephant grasses.
III. It is totally devoid of broad-leaved tree species like Sal.
Which of the above statement(s) is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

100. In forest sampling, the "Point-Quarter Method" is a distance-based technique primarily used to determine:
(A) Determining exact subterranean water table depths
(B) Calculating tree age by counting annual growth rings
(C) Estimating tree density without physical plot boundaries
(D) Measuring organic carbon sequestered in deep soil layers

101. The transition zone between two distinct biological communities, such as between a forest and a grassland, is known as an:
(A) Ecotone
(B) Ecotype
(C) Ecosphere
(D) Ecological niche

102. Which of the following best describes the ecological niche of a species in a forest?
(A) The specific physical location where an organism nests
(B) The geographical coordinates defining a species habitat
(C) The long-term evolutionary history of a species lineage
(D) The functional role and resource use of a species

103. Gause's Principle of Competitive Exclusion states that in a stable forest ecosystem:
(A) Apex predators will always eliminate all prey populations completely
(B) Two species cannot occupy the exact same niche indefinitely
(C) Non-native species cannot survive alongside established natives
(D) Understory plants cannot survive beneath dense canopy cover

104. Which soil formation process is typical of temperate and boreal coniferous forests, resulting in a highly leached, acidic, and ash-grey surface layer?
(A) Laterization
(B) Salinization
(C) Podzolization
(D) Calcification

105. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): Habitat fragmentation poses a severe threat to large mammalian carnivores like tigers.
Reason (R): Large carnivores require extensive contiguous territories to maintain viable populations and genetic diversity.
(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

106. In assessing the biodiversity of a forest region, what does "Gamma diversity" refer to?
(A) Total species diversity across a broad landscape
(B) Species diversity contained within a single localized habitat
(C) Compositional change in species along environmental gradients
(D) Genetic variation present strictly within isolated populations

107. Which ecosystem service provided by forests is classified as a "Provisioning Service"?
(A) Natural water filtration and purification
(B) Supply of timber, medicinal plants, and food
(C) Regional climate regulation and carbon

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88. Lichens are highly sensitive to which major atmospheric pollutant, making them excellent bioindicators of forest air quality?
(A) Carbon dioxide
(B) Ozone
(C) Sulfur dioxide
(D) Methane

89. In a food chain operating within a forest ecosystem, which organisms occupy the first trophic level?
(A) Primary consumers like deer and herbivores
(B) Secondary consumers like apex carnivores
(C) Soil decomposers like bacteria and fungi
(D) Primary producers like trees and plants

90. Eutrophication in adjacent water bodies can be an indirect consequence of deforestation because:
(A) Soil erosion increases nutrient runoff into water bodies
(B) Canopy loss reduces solar radiation reaching water surfaces
(C) Tree removal boosts dissolved oxygen levels in aquatic systems
(D) Soil compaction blocks rainwater from entering groundwater aquifers

91. The Bhabar tract in northern Uttar Pradesh, located just below the Shiwaliks, is ecologically characterized by:
(A) Permanently waterlogged and swampy marshland soils
(B) Coarse porous gravel soils where streams sink subterranean
(C) Saline alkaline soils supporting stunted scrub vegetation
(D) High-altitude alpine pastures and alpine meadow zones

92. The 'Taungya' system, historically adopted in Indian forestry, is a form of:
(A) Clearing primary forests permanently for agriculture
(B) Growing seasonal crops between rows of young trees
(C) Harvesting mature timber stands using machinery
(D) Herding livestock across alpine summer pastures

93. Which functional component of a forest ecosystem dictates the total amount of living organic matter (biomass) present at any given time?
(A) The standing crop
(B) The standing state
(C) Gross primary productivity
(D) The ecological footprint

94. Match List I with List II and select the correct option.
List I: Himalayan Forest Zone
P. Sub-tropical
Q. Temperate
R. Sub-alpine
S. Alpine
List II: Dominant Tree Genus
1. Pinus (Chir Pine)
2. Quercus (Oak)
3. Betula (Birch)
4. Rhododendron scrub
(A) P-2, Q-1, R-4, S-3
(B) P-1, Q-3, R-2, S-4
(C) P-1, Q-2, R-3, S-4
(D) P-3, Q-2, R-1, S-4

95. A "Flagship Species" in forest conservation is typically defined as:
(A) Microscopic organisms monitored for assessing soil quality
(B) Pioneer species that colonize newly exposed rock faces
(C) Invasive weeds that suppress native forest floor flora
(D) Species used to raise awareness and support conservation

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96. "Dieback" is a condition observed in forest trees characterized by:
(A) Rapid vertical growth of canopy foliage during spring
(B) Seasonal shedding of broad leaves during autumn months
(C) Progressive death of branches from tips inward
(D) Accelerated germination of dormant seeds after forest fires

97. Which silvicultural system is based on the removal of all mature trees in a single operation to create an even-aged stand?
(A) Selective Selection System
(B) Clear-felling System
(C) Uniform Shelterwood System
(D) Natural Coppice System

98. In ecological terms, the concept of a 'Carbon Sink' applies to a forest when:

118. Which non-destructive remote sensing technology uses laser pulses to generate precise 3D models of forest canopy structure and ground topography?
(A) RADAR
(B) Thermal Infrared
(C) Sonar
(D) LiDAR

119. A "Seed Bank" in forest ecology refers to:
(A) Government seed vault storing genetically altered crop seeds
(B) Dormant viable seeds stored naturally in topsoil layers
(C) Commercial plant nursery raising seedlings for afforestation
(D) Financial capital allocated specifically for planting projects

120. Which theory of ecological succession posits that every region has only one true climax community determined exclusively by the regional climate?
(A) Polyclimax Theory
(B) Climax Pattern Hypothesis
(C) Monoclimax Theory
(D) Initial Floristic Composition model

121. In Uttar Pradesh, the "Van Mahotsav" initiated in 1950 aims primarily to:
(A) Commercializing timber logging operations state-wide
(B) Relocating indigenous communities away from reserves
(C) Planting exotic ornamental trees for urban landscaping
(D) Promoting public tree planting and eco-awareness

122. Which of the following indicates an uneven-aged forest stand?
(A) Trees of diverse sizes and ages form a multi-layered canopy
(B) All standing trees share uniform height and trunk diameter
(C) The canopy is strictly single-layered and continuous
(D) The stand consists exclusively of one pioneer species

123. The total dry weight of all organisms present in a specific area of a forest at a specific time is known as:
(A) Biome
(B) Biomass
(C) Carrying capacity
(D) Primary production

124. According to ecological principles, why is the food chain in a forest rarely longer than 4 or 5 trophic levels?
(A) Because apex carnivores consume herbivores rather than plant matter
(B) Energy loss at each trophic transfer limits food chain length
(C) Because forest biomes lack biodiversity for extra levels
(D) Because decomposers absorb all ecosystem energy immediately

125. The ecological phenomenon where unrelated species evolve similar traits when occupying similar niches in geographically separated forests is called:
(A) Divergent biological evolution
(B) Convergent evolution
(C) Coevolutionary adaptation process
(D) Adaptive radiation dynamics

126. "Ground Truthing" in the context of mapping forest cover via satellite imagery refers to:
(A) Theoretical estimation of standing canopy height
(B) Stripping soil layers to evaluate mineral composition
(C) Visiting field sites to verify satellite imagery data
(D) Calculating subterranean root biomass and density

127. Match List I with List II and select the correct option.

List I: Valuation Method
P. Contingent Valuation
Q. Travel Cost Method
R. Hedonic Pricing
S. Market Price Method

List II: Application in Forest Ecology
1. Valuing recreational benefits based on visitors' expenses
2. Directly valuing timber sold in the market
3. Assessing willingness to pay via structured surveys
4. Valuing aesthetic benefits based on nearby real estate prices

(A) P-1, Q-3, R-2, S-4
(B) P-3, Q-4, R-1, S-2
(C) P-2, Q-1, R-4, S-3
(D) P-3, Q-1, R-4, S-2

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(D) Cultural, spiritual, and recreational benefits

108. The C:N (Carbon to Nitrogen) ratio of forest litter is a critical factor because it determines:
(A) The visual colour profile of topsoil horizons
(B) The microbial organic decomposition rate
(C) The maximum depth of root system penetration
(D) The probability of seasonal forest fire events

109. If forest litter has a very high C:N ratio (e.g., woody debris), its decomposition will be:
(A) Slower, due to microbial nitrogen limitation
(B) Extremely rapid, releasing available nitrogen immediately
(C) Completely halted until rainfall leaches excess carbon
(D) Rapid and instantaneous via natural plant autolysis

110. Which type of natural forest soil is typically characterized by a very thick, fertile A-horizon, but is rare in tropical regions due to rapid leaching?
(A) Highly weathered tropical lateritic soils
(B) Arid region desert soils with low organic matter
(C) Temperate grassland Mollisols and Alfisols
(D) Saturated organic peat bog soils and Histosols

111. The process by which water from the forest canopy and soil surface is converted to vapour and drawn through plants into the atmosphere is comprehensively termed:
(A) Atmospheric precipitation process
(B) Solid ice sublimation process
(C) Water vapour condensation process
(D) Plant evapotranspiration process

112. How do dense forest canopies influence the process of rainfall reaching the soil?
(A) They accelerate the velocity of falling raindrops onto topsoil
(B) They repel rainfall entirely, preventing water ground entry
(C) They intercept rain, reducing impact energy on the soil
(D) They evaporate incoming precipitation immediately upon contact

113. In forest hydrology, "Stemflow" refers to:
(A) The upward flow of xylem sap within the central tree trunk
(B) Water running down tree trunks to the soil surface
(C) The turbulent movement of water in forest surface streams
(D) The subterranean flow of moisture through root channels

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114. The "Cuscuta" (Dodder) plant found occasionally in forest areas represents which type of ecological interaction?
(A) Amensalistic interaction
(B) Mutualistic association
(C) Commensal relationship
(D) Complete parasitism

115. Which region of Uttar Pradesh is known for its extensive ravine lands that pose severe ecological challenges due to gully erosion?
(A) Chambal and Yamuna river basin areas
(B) Upper Doab region located near Saharanpur district
(C) Terai belt region adjoining the international border
(D) Eastern plain districts surrounding Ballia territory

116. Biological Nitrogen Fixation in forest soils is primarily carried out by:
(A) Photosynthetic broad leaves within upper tree canopies
(B) Soil invertebrates like earthworms and millipedes
(C) Free-living and symbiotic nitrogen-fixing bacteria
(D) Specialized fungi involved in wood lignin decomposition

117. Consider the following statements regarding barriers to natural forest regeneration:
I. Excessive accumulation of dense, undecomposed leaf litter can prevent seeds from reaching the soil.
II. Heavy grazing destroys young seedlings before they establish.
III. Complete absence of sunlight on the forest floor favours pioneer light-demanding species.
IV. Frequent ground fires destroy the seed bank in the topsoil.
Which of the above statement(s) is/are correct?
(A) I, II, and III only
(B) I, II, and IV only
(C) II, III, and IV only
(D) I, III, and IV only

(C) The southern hilly Vindhyan plateau region
(D) The western semi-arid border district areas

60. Match List I with List II and select the correct option.

List I: Cause of Deforestation
P. Mining
Q. Overgrazing
R. Linear Infrastructure (Roads/Railways)
S. Shifting Cultivation

List II: Ecological Impact
1. Habitat fragmentation and wildlife roadkills
2. Periodic clearance of forest patches and soil nutrient depletion
3. Complete topsoil removal and heavy metal contamination
4. Soil compaction and suppression of natural seedling regeneration

(A) P-4, Q-3, R-2, S-1
(B) P-3, Q-4, R-1, S-2
(C) P-3, Q-1, R-4, S-2
(D) P-2, Q-4, R-1, S-3

61. In the context of forest ecology, what is "Allelopathy"?
(A) The chemical inhibition of one plant species by another
(B) The symbiotic relationship between fungi and plant roots
(C) The physical suppression of ground flora by dense canopy shade
(D) The dependency of certain seeds on fire for germination

62. The natural regeneration of forests can be severely hindered by human activities. Which of the following activities causes soil compaction leading to poor seedling establishment?
(A) Selective removal of mature timber
(B) Controlled prescribed burning
(C) Heavy, uncontrolled livestock grazing
(D) Harvesting of non-timber forest products (NTFPs) like honey

63. "Coppicing" is a biological phenomenon and management practice where:
(A) Trees are uprooted entirely to plant agricultural crops
(B) Seeds are broadcasted via aircraft over degraded lands
(C) Invasive species are biologically controlled using specific insects
(D) Cut trees regenerate new shoots from the remaining stump or roots

64. A scientific method commonly used for sampling vegetation to determine species density and frequency in a forest is the:
(A) Hydrometer method
(B) Seismograph monitoring
(C) Quadrat method
(D) Carbon dating method

65. The Normalized Difference Vegetation Index (NDVI) is widely used in remote sensing of forests. NDVI essentially measures:
(A) Total moisture content present in deep subterranean bedrock
(B) Vegetation density and health based on reflected light spectra
(C) Total volume of greenhouse gases emitted by local plant canopy
(D) Exact age distribution of individual dominant tree species stands

66. How does an increase in global temperatures due to climate change typically affect forest biomes geographically?
(A) It shifts forest biomes toward low-latitude equatorial zones
(B) It restricts forest vegetation strictly to lower elevation valleys
(C) It maintains existing biome boundaries without significant shifts
(D) It shifts tree lines upward and latitudinal boundaries poleward

67. Consider the following statements regarding the role of forests in watersheds:
I. Forests reduce peak flood flows by absorbing rainfall.
II. Deep forest roots enhance the infiltration of water into aquifers.
III. Deforestation in a watershed usually decreases total annual surface runoff.

Which of the above statement(s) is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II, and III

68. Phenological changes in a forest ecosystem due to climate change refer to:
(A) Modifications in deep geological rock strata below forest soil
(B) Evolutionary mutations creating entirely new plant species genera
(C) Shifts in timing of recurring plant life events like flowering

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128. What is the primary ecological difference between a National Park and a Biosphere Reserve?
(A) National Parks focus strictly on ex-situ species conservation methods
(B) National Parks cover much larger geographical areas than Biosphere Reserves
(C) Biosphere Reserves allow human use; National Parks prohibit exploitation
(D) Biosphere Reserves are designated strictly for marine and coastal zones

129. Eco-Sensitive Zones (ESZs) are declared around Protected Areas in India to act as:
(A) Unrestricted industrial development corridors
(B) Shock absorbers regulating adjacent human activities
(C) Zones set aside exclusively for intensive mining operations
(D) Territories completely devoid of any local human settlements

130. The "Transition Zone" of a Biosphere Reserve is characterized by:
(A) Strictly protected core region prohibiting all human presence
(B) Zone used exclusively for research without resident populations
(C) Fully urbanized area dedicated to commercial industrial activity
(D) Zone where management and communities work sustainably

131. The Uttar Pradesh Forest Department manages the administrative hierarchy of state forests. Which of the following is the standard territorial unit just below a Forest Division?
(A) Forest Range
(B) Forest Circle
(C) Forest Beat
(D) Forest Section

132. The process by which toxic substances, like heavy metals or certain pesticides, increase in concentration at higher trophic levels in a forest food web is known as:
(A) Bioaccumulation
(B) Eutrophication
(C) Biomagnification
(D) Nitrification

133. Which component of the forest ecosystem is primarily responsible for preventing the buildup of dead organic matter?
(A) Decomposers
(B) Primary producers
(C) Herbivores
(D) Carnivores

134. Which of the following climatic zones represents the natural habitat of Boreal Forests (Taiga)?
(A) High temperature and high rainfall equatorial regions
(B) Hot, dry summers and mild, wet winters
(C) Arid zones with less than 25 cm annual rainfall
(D) Long, severe winters and short, cool summers in subarctic regions

135. What defines "Myrmecophily" in certain tropical forest plants?
(A) Specialized flower pollination carried out exclusively by bats
(B) Symbiosis with ants providing plant protection and food exchange
(C) Seed dispersal mediated by aquatic mammals in river systems
(D) Insect trapping and digestion performed by carnivorous species

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136. Select the correct sequence of zones in a typical Biosphere Reserve, moving from the most protected interior to the outermost region:
(A) Buffer Zone → Core Zone → Transition Zone
(B) Transition Zone → Buffer Zone → Core Zone
(C) Core Zone → Buffer Zone → Transition Zone
(D) Core Zone → Transition Zone → Buffer Zone

137. Which state institution oversees the commercial harvesting, processing, and sale of timber and tendu leaves in UP?
(A) Uttar Pradesh Pollution Control Board
(B) Uttar Pradesh Biodiversity Board
(C) State Wetland Authority
(D) Uttar Pradesh Forest Corporation

138. The state flower of Uttar Pradesh, commonly found in the deciduous forests of the region and known as the "Flame of the Forest", is:
(A) Palash (Butea monosperma)
(B) Lotus (Nelumbo nucifera)
(C) Rhododendron (Rhododendron arboreum)
(D) Jasmine (Jasminum officinale)

79. The total amount of carbon fixed by photosynthesis in a forest over a given period is known as:
(A) Net Primary Productivity metric (NPP)
(B) Secondary Biological Productivity
(C) Total Ecosystem Standing Crop
(D) Gross Primary Productivity (GPP)

80. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): Humification is a very fast process in deep tropical forest soils.
Reason (R): Humus is highly resistant to microbial action and undergoes decomposition at an extremely slow rate.
(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

81. In the context of Uttar Pradesh, what is the primary objective of establishing "Sacred Groves"?
(A) Clearing native forest lands for religious construction projects
(B) Protecting forest patches driven by cultural and religious values
(C) Promoting commercial timber harvesting by religious institutions
(D) Establishing ex-situ wildlife conservation facilities like zoos

82. Which structural feature helps tropical dry deciduous trees survive extended periods of drought?
(A) Retaining thick evergreen leaves year-round to store excess moisture
(B) Developing massive buttress root systems in waterlogged soils
(C) Developing specialized pneumatophores to access free oxygen
(D) Shedding leaves during dry periods to reduce transpiration loss

83. Compensatory Afforestation in India is mandated under which circumstance?
(A) Forest land is diverted for non-forest industrial or development uses
(B) Agricultural farmland is permanently converted into urban housing zones
(C) A designated wildlife sanctuary is officially upgraded to a national park
(D) Private degraded land is voluntarily planted with native tree species

84. A "Wildlife Corridor" serves which vital ecological function?
(A) Isolating animal populations to prevent disease transmission
(B) Restricting wildlife movement within a single designated park
(C) Facilitating animal dispersal between fragmented forest areas
(D) Serving as an exclusive access road for forest patrol vehicles

85. The state tree of Uttar Pradesh, which plays a role in local ecology by providing dense shade and nesting sites, is:
(A) Ashoka (Saraca asoca)
(B) Banyan (Ficus benghalensis)
(C) Sal (Shorea robusta)
(D) Palash (Butea monosperma)

86. The concept of 'Endemism' in forest ecology implies that a species is:
(A) Globally distributed across multiple geographic continents
(B) An introduced exotic species that becomes highly invasive
(C) Extinct in wild habitats and preserved only in botanical gardens
(D) Restricted naturally to a specific geographic region

87. Consider the following statements regarding the adaptations of mangrove ecology:
I. They develop salt-excreting glands on their leaves.
II. They lack deep taproots, relying instead on shallow, wide-spreading root systems for stability in mud.
III. They reproduce exclusively through vegetative propagation, lacking true seeds.
IV. Their wood is typically dense and highly resistant to rot.
Which of the above statement(s) is/are correct?
(A) I, II, and III only
(B) I, II, and IV only
(C) II, III, and IV only
(D) I, III, and IV only

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patterns
(D) Presence and density of local human settlements

149. In the stratification of a typical tropical rainforest, giant trees pushing above the main canopy are termed:
(A) The Emergent layer
(B) The Benthic substrate zone
(C) The Understory canopy layer
(D) The Sub-canopy vegetation

150. Which of the following types of roots is characteristically found in tall emergent tropical rainforest trees to provide structural support in shallow soils?
(A) Tap roots
(B) Pneumatophores
(C) Aerial roots
(D) Buttress roots

151. According to ISFR 2021, which district of Uttar Pradesh has the lowest area under forest cover?
(A) Mainpuri district
(B) Sant Ravidas Nagar
(C) Mau district territory
(D) Deoria district area

152. "Lianas" are a common vegetative feature of which forest type?
(A) Alpine scrub
(B) Boreal forests
(C) Tropical Rainforests
(D) Temperate coniferous forests

153. A forest ecosystem provides 'regulating services'. Which of the following is an example of a regulating service?
(A) Timber harvested for commercial paper pulp
(B) Cultural identity derived from sacred groves
(C) Financial revenue collected from eco-tourism
(D) Regulation of local climate and diseases

154. In forest ecological research, "Telemetry" is widely used for:
(A) Tracking wildlife movement using collars
(B) Measuring chemical nutrient content in topsoil
(C) Determining photosynthetic rates of broad leaves
(D) Estimating total age of standing timber stands

155. The ecological phenomenon where two species are found in the same habitat but utilize different resources to minimize competition is called:
(A) Competitive exclusion
(B) Resource partitioning
(C) Biomagnification
(D) Secondary succession

NQDIA

156. The conversion of atmospheric nitrogen gas into ammonia by soil bacteria is known as:
(A) Bacterial denitrification
(B) Biological nitrogen fixation
(C) Soil nitrification biological process
(D) Soil organic ammonification

157. Which environmental factor fundamentally restricts the formation of forests in natural grassland ecosystems (like savannas or steppes)?
(A) Low rainfall and periodic fires
(B) Persistently high summer temperatures
(C) Inadequate soil mineral nutrient levels
(D) High ambient carbon dioxide concentration

158. The Indian Forest Act of 1927 primarily categorizes forests into which administrative classes for regulatory purposes?
(A) Core, Buffer, and Transition forests
(B) Tropical, Temperate, and Alpine forests
(C) Reserve, Protected, and Village forests
(D) National, State, and Community forests

159. The 'Shola' forests are a unique ecological formation characterized by patches of stunted tropical montane forest rolling amidst grasslands. In India, they are exclusively found in:
(A) The lower Himalayas of Uttarakhand state
(B) The Aravalli mountain range of Rajasthan
(C) The Vindhyan hills region of Uttar Pradesh
(D) High altitudes of the Western Ghats

160. Which of the following accurately describes a "Seral Community" in forest succession?
(A) The final stable climax community
(B) A barren environment lacking life
(C) An intermediate stage of succession
(D) A community undergoing local extinction

161. In measuring the diameter of a standing tree in forest inventories, standard "Diameter at Breast Height" (DBH) in India is conventionally measured at what height from the ground?
(A) 0.5 meters above ground
(B) 1.0 meter above ground
(C) 1.37 meters
(D) 2.0 meters above ground

162. How does the process of 'Leaching' negatively affect tropical forest soils after deforestation?
(A) Drastically increasing soil organic carbon levels
(B) Causing soil alkalinity to rise significantly
(C) Promoting rapid regeneration of climax trees
(D) Rain washes away soluble soil nutrients

163. Consider the following statements regarding Ecological Pyramids:
I. The pyramid of numbers can be inverted in a forest ecosystem where a single large tree supports many insects.
II. The pyramid of biomass is always inverted in a terrestrial forest ecosystem.
III. The pyramid of energy is always upright.
IV. Energy pyramids account for the 10% law of energy transfer.
Which of the above statement(s) is/are correct?
(A) I, II, and III only
(B) I, III, and IV only
(C) II, III, and IV only
(D) I, II, and IV only

164. What is the primary ecological significance of "Snags" (standing dead trees) in a forest ecosystem?
(A) Acting as primary fire hazards requiring complete removal
(B) Actively sequestering carbon dioxide from atmosphere
(C) Providing nesting and habitat for wildlife species
(D) Preventing severe soil erosion through active root systems

165. The term 'Silviculture' formally refers to:
(A) Controlling forest growth and composition
(B) Industrial processing of timber into paper pulp
(C) Specialized study of forest wildlife diseases
(D) Legal frameworks governing forest tribal rights

166. A "Monoculture" forest plantation typically exhibits which of the following ecological characteristics compared to a natural mixed forest?
(A) High structural complexity across canopy layers
(B) Greater resilience to species-specific plant diseases
(C) Enhanced carrying capacity for diverse fauna species
(D) Lower biodiversity and higher pest vulnerability

167. Why are 'Endemic species' particularly vulnerable to extinction due to deforestation?
(A) Requiring extensive global habitats for migration
(B) Having restricted ranges and specific habitats
(C) Exhibiting exceptionally high reproductive rates
(D) Lacking effective natural predators in ecosystems

168. Which of the following best describes the ecological function of the 'Ozone layer' situated in the stratosphere, indirectly supporting terrestrial forest life?
(A) Preventing atmospheric heat from escaping into outer space
(B) Serving as a direct oxygen source for plant cellular respiration
(C) Absorbing harmful UV radiation to protect plant cells
(D) Supplying gaseous nitrogen directly to upper canopy foliage

169. What is the standard scientific unit used globally to estimate the amount of carbon sequestered in a forest ecosystem?
(A) Volume of CO_2 in litres per hectare
(B) Energy output in kilowatt-hours per square metre
(C) Sound intensity in decibels per cubic metre
(D) Tonnes of Carbon per hectare

170. Which natural phenomenon is essential for the regeneration of certain coniferous forest species (like specific pines) because it helps open their serotinous cones to release seeds?
(A) Periodic surface fires
(B) Prolonged seasonal river flooding
(C) Severe sub-zero winter frosts
(D) High-velocity atmospheric winds

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ANSWERS

1. (B) The study of the scientific interactions between organisms and their environment within a forest ecosystem
Forest ecology is a branch of biological science that focuses on understanding the complex relationships between living organisms and their non-living physical environment within forest ecosystems. It examines how flora, fauna, and microorganisms interact with soil, climate, water, and nutrient cycles to maintain structural stability, function, biodiversity, and ecosystem resilience over long periods.

2. (D) It helps in understanding nutrient cycling and species interdependence to maintain ecosystem resilience
Sustainable forest management requires a thorough understanding of underlying ecological processes. Scientific knowledge regarding nutrient cycling, trophic interactions, and species interdependence allows foresters to design management practices that preserve ecosystem health. By analyzing how trees, animals, and soil biota interact, silviculturists can harvest timber while maintaining forest resilience, productivity, soil fertility, and overall biological diversity.

3. (A) Deciduous Forest
Deciduous forests are characterized by broad-leaved tree species that undergo periodic leaf shedding during specific dry or cold seasons. This physiological mechanism reduces transpiration rates, allowing trees to conserve water during periods of stress. These ecosystems experience distinct seasonal variations, facilitating nutrient replenishment on the forest floor through annual leaf litter decomposition and supporting diverse terrestrial animal life.

4. (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
Tropical rainforests host unmatched terrestrial biodiversity due to constant high temperatures and abundant rainfall throughout the year. These stable climatic conditions prevent cold or drought stress, supporting continuous solar energy capture and plant growth. Year-round primary productivity provides abundant food resources and complex microhabitats, driving evolutionary speciation and enabling high species richness within multi-layered vertical canopy structures.

5. (A) They have distinct seasonal changes with a defined winter
Temperate forests are situated in mid-latitude regions and experience four distinct seasonal shifts, including a well-defined cold winter period. Unlike tropical rainforests that maintain continuous warm temperatures and heavy rainfall year-round, temperate forests adapt to variable thermal regimes. Their vegetation undergoes annual dormancy cycles, leaf loss in broadleaf species, or needle retention in conifers to survive low temperatures.

6. (D) P-2, Q-3, R-1, S-4
Global forest biomes display distinct structural and climatic characteristics. The Taiga is dominated by cold-tolerant coniferous species like spruce and pine. Tropical rainforests feature a continuous dense canopy sustained by heavy rainfall. Mediterranean forests adapt to wet winters and dry summer droughts. Savanna woodlands feature open tree canopy cover above a continuous grass understory, shaping distinct ecosystem productivity and biodiversity.

7. (B) Climate, topography, soil, and past treatments
Champion and Seth established a comprehensive classification system for Indian forests in 1968 based on multi-factorial ecological criteria. Their scheme considers temperature and rainfall regimes, topographical features, soil composition, and historical biotic interventions or silvicultural treatments. By integrating these physical and operational factors, the classification provides a standardized framework for mapping, managing, and conserving diverse forest types across India.

8. (C) 16
Champion and Seth categorized the vegetation of India into sixteen major forest type groups based on temperature, moisture, topography, and soil conditions. These major groups encompass diverse environments ranging from tropical wet

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evergreen forests to alpine pastures. Each group is further subdivided into subgroups, providing a detailed hierarchical framework essential for ecological assessment, forestry management, and regional conservation planning.

9. (A) I and II only
Forest ecology provides essential scientific principles for understanding carbon sequestration dynamics, which supports global climate change mitigation strategies. It also provides insights into species interactions, helping managers prevent and control damaging invasive alien species. However, converting natural forests into agricultural land degrades ecosystem services, depletes biodiversity, disrupts hydrological regimes, and contradicts the foundational goals of ecological conservation and sustainable forestry.

10. (A) Tropical Dry Deciduous Forests
Tropical Dry Deciduous Forests constitute the single largest forest type group in India, covering over thirty percent of the total forest land. Found in regions with moderate rainfall and prolonged dry periods, these forests feature broad-leaved trees that shed leaves during summer. They dominate vast areas across central, western, and northern India, including major parts of the Gangetic plain.

11. (B) Tropical Moist Deciduous Forests
The Terai region of Uttar Pradesh lies in the moist sub-Himalayan belt characterized by rich alluvial soils, high groundwater tables, and heavy seasonal monsoon precipitation. These environmental conditions favor the development of Tropical Moist Deciduous Forests. These forests feature economically and ecologically important timber species such as Sal and Teak alongside dense understory growth and tall grass species.

12. (B) Tropical Moist Deciduous Forests
Sal, scientifically known as Shorea robusta, is a dominant climax tree species characteristic of Tropical Moist Deciduous Forests in northern India, including Uttar Pradesh. It thrives in well-drained alluvial and sub-Himalayan soils with moderate to high rainfall. Sal forms extensive dense stands that provide valuable commercial timber, structural canopy cover, and vital habitat for various woodland fauna species.

13. (A) Tropical Dry Deciduous and Thorn Forests
The Bundelkhand region of Uttar Pradesh is characterized by semi-arid climatic conditions, low annual rainfall, rocky terrain, and prolonged hot summer seasons. Consequently, the native vegetation consists predominantly of Tropical Dry Deciduous and Thorn Forests. Common species include drought-tolerant trees like Acacia, Ziziphus, and Anogeissus, which feature reduced leaf surface area and thorny adaptations to conserve moisture.

14. (C) Deodar (Cedrus deodara)
Deodar is a large coniferous tree natively adapted to temperate montane climates, thriving in high-elevation zones of the Himalayan mountain range between fifteen hundred and three thousand meters. It requires cool temperatures and well-drained mountain slopes. Consequently, it does not naturally occur in the warm tropical and subtropical alluvial plain environments that characterize the vast majority of Uttar Pradesh.

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15. (A) II, IV, I, III
Structural stratification in a mature tropical forest spans four distinct vertical layers from top to bottom. Giant isolated trees form the topmost Emergent layer, followed by the continuous upper Canopy layer. Beneath this lies the shaded Understory layer composed of small trees and shrubs, while the Forest floor forms the bottommost layer where soil organic matter decomposes.

16. (C) The continuous layer formed by the crowns of tall trees
In forest ecology, the canopy refers to the dense upper layer created by the interlocking crowns of mature tall trees. This structural layer acts as the primary site of photosynthetic activity, intercepting the majority of incoming sunlight and atmospheric precipitation. It regulates the microclimate of lower forest strata by controlling light penetration, temperature fluctuations, humidity levels, and wind movement.

17. (B) Forest floor
The forest floor receives the lowest intensity of solar radiation within a stratified forest ecosystem, often less than two percent of ambient sunlight. The dense overhead canopy and intermediate understory layers absorb and reflect almost all incoming light. As a result, the forest floor remains heavily shaded, damp, and

cool, favoring shade-adapted organisms, mosses, fungi, and decomposers.

18. (D) Epiphytes
Epiphytes are non-parasitic plants that grow upon other living host plants purely for physical support, positioning themselves higher in dense forest canopies to access solar radiation. They derive water and dissolved inorganic nutrients directly from air, rain, and accumulated debris. Common examples include various tropical orchids, ferns, bromeliads, and mosses, which enhance overall canopy structure and species diversity.

19. (B) I, II, and IV only
The sub-Himalayan Terai-Bhabar belt supports tall grasslands and moist Sal forests, while the southern Vindhyan plateau hosts dry deciduous vegetation. Afforestation using hardy species like Acacia helps stabilize severely eroded ravine lands. However, mangrove forests are ecologically restricted to coastal intertidal saline zones and are absent from Uttar Pradesh, which is entirely landlocked and lacks estuarine coastal habitats.

20. (C) The species diversity within a specific local community
Alpha diversity measures biodiversity at a local scale, representing the number of species present within a uniform habitat or specific ecological community. It provides a foundational baseline for evaluating localized species richness and structural complexity. In contrast, beta diversity quantifies species turnover between distinct habitats, while gamma diversity measures total species richness across an entire landscape or regional ecosystem.

21. (A) Keystone species
A keystone species exercises a disproportionately large role in shaping ecological community structure and maintaining ecosystem integrity relative to its overall biomass or abundance. Its presence regulates predator-prey dynamics, resource availability, or habitat structure. Removing a keystone species causes drastic cascading alterations in community composition, often leading to significant biodiversity loss and ecosystem instability across multiple trophic levels.

22. (D) Precipitation patterns
Precipitation patterns represent a primary abiotic factor influencing forest ecosystem dynamics and biological productivity. Rainfall availability dictates soil moisture, nutrient absorption capacity, and plant transpiration rates, directly constraining photosynthetic activity and plant distribution. In contrast, herbivory rates, microbial activity, and pollinator availability represent biotic components, as they involve living organisms interacting within the broader food web and forest environment.

23. (B) Water retention capacity and root aeration
Soil porosity refers to the volume of pore spaces between soil particles, directly dictating air and water movement through the underground substrate. Adequate porosity ensures efficient infiltration, moisture retention, and gaseous exchange, providing plant roots with essential oxygen and water for cellular respiration. Proper pore distribution also prevents soil compaction and waterlogging, promoting optimal root development and microbial activity.

24. (C) Nitrogen
Nitrogen is an essential macronutrient required for synthesizing plant proteins, nucleic acids, and chlorophyll, often serving as a primary limiting factor for forest productivity. Leguminous tree species possess root nodules colonized by symbiotic nitrogen-fixing bacteria such as Rhizobium. These microorganisms convert atmospheric nitrogen into bioavailable ammonium forms, enriching the soil and supporting sustainable forest vegetation growth and ecosystem health.

25. (D) P-1, Q-2, R-4, S-3
Nutrient cycles rely on specific environmental reservoirs to circulate essential elements through ecosystems. The carbon cycle draws carbon dioxide from the atmosphere, while the nitrogen cycle uses atmospheric nitrogen gas. The phosphorus cycle depends on sedimentary rock weathering as its primary pool, and the hydrological cycle circulates water through vast oceanic, surface, and subterranean aquatic reservoirs worldwide.

26. (A) They decay organic matter to aid microbial decomposition
Detritivores, including earthworms, woodlice, millipedes, and beetles, play a vital role in forest

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suitable for annual herbs. Deepening soil allows perennial grasses, woody shrubs, and shade-tolerant climax trees to sequentially establish, culminating in a stable, self-perpetuating forest community.

44. (B) To filter sediment and nutrient runoff before reaching water bodies
Riparian forest buffers are vegetated strips along streams and rivers that protect aquatic ecosystems. Dense roots and understory foliage physically trap eroded topsoil, filter excess agricultural nutrient runoff, and absorb chemical pollutants before water enters aquatic channels. These forest zones stabilize stream banks, reduce water temperatures through shading, prevent channel sedimentation, and improve overall water quality.

45. (A) Humus
Humus is a dark, amorphous organic substance produced by complete microbial decomposition of plant litter and animal remains in topsoil. It possesses high cation exchange capacity and water retention capability, improving soil structure, aeration, and nutrient retention. Humus decomposes extremely slowly, serving as a stable reservoir of macronutrients that continuously feeds soil microorganisms and supporting healthy plant root growth.

46. (C) O Horizon
The O Horizon constitutes the uppermost layer of a typical forest soil profile, situated directly above mineral soil. It consists predominantly of fresh, partially decomposed, or completely fragmented organic materials derived from fallen broad leaves, twigs, bark, and animal remains. This organic layer acts as a protective blanket, reducing surface erosion, moderating soil temperature, and driving active nutrient cycling.

47. (D) Mineralization
Mineralization is the biological process during litter decomposition where specialized soil microorganisms convert complex organic compounds into simple, bioavailable inorganic nutrients such as ammonium, nitrate, and phosphate. Occurring alongside humification, mineralization releases essential mineral nutrients into the soil solution, making them accessible for plant root absorption and sustaining primary biological productivity across forest ecosystems.

48. (C) Fungi
Fungi represent the predominant group of decomposer microorganisms capable of enzymatically breaking down tough, complex woody polymers such as lignin and cellulose. Specialized wood-decay fungi synthesize powerful extracellular enzymes that cleave complex aromatic chemical bonds in dead timber. Their extensive hyphal networks penetrate dense wood, accelerating organic decomposition and returning sequestered carbon and nutrients to topsoil profiles.

49. (A) I, II, and III only
According to standard Indian forest cover classification, Moderately Dense Forest has a canopy closure between forty and seventy percent, Very Dense Forest exceeds seventy percent, and Open Forest ranges from ten to forty percent. Scrubland, however, is defined by sparse vegetation with canopy density strictly below ten percent, making the statement assigning scrub twenty to thirty percent incorrect.

50. (D) Lower daytime maximum temperatures and higher humidity
The internal microclimate of a mature forest differs markedly from adjacent open fields due to dense structural foliage cover. Tree canopies block direct solar radiation and buffer ambient wind flow, lowering daytime maximum temperatures and reducing ground surface evaporation. High plant transpiration retains moisture under the canopy, resulting in elevated relative humidity and moderated diurnal thermal fluctuations.

51. (A) Environmental conditions favoring edge-adapted species
The edge effect refers to distinct microclimatic and structural changes occurring at boundary zones where two contrasting habitats meet, such as a forest edge bordering open land. Increased solar exposure, wind penetration, and temperature variations at these boundaries favor generalist, light-demanding, and invasive species. Consequently, species composition shifts significantly compared to the shaded interior core forest environment.

52. (C) Aerial roots that enable gas exchange in anaerobic mangrove soils
Pneumatophores are specialized, vertically erect aerial roots produced by mangrove species growing in waterlogged, anaerobic coastal muds.

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35. (B) 6.15%
According to the India State of Forest Report 2021, the state of Uttar Pradesh possesses approximately six point one five percent of its total geographical area under recorded forest cover. This percentage reflects a relatively low forest density compared to the national average, primarily due to extensive conversion of fertile Gangetic alluvial plains into intensive agricultural and urban development areas.

36. (A) I and II only
Forests function as vital global carbon sinks by absorbing atmospheric carbon dioxide during photosynthesis and storing it as organic carbon biomass. Conversely, autotrophic plant respiration and heterotrophic microbial soil decomposition release carbon dioxide back into the atmosphere. Deforestation destroys standing tree biomass, accelerates soil organic matter decay, and severely reduces long-term soil carbon sequestration capacity rather than increasing it.

37. (A) Sonbhadra
Sonbhadra district holds the highest percentage of forest cover relative to geographical area in Uttar Pradesh, as documented in the ISFR 2021 report. Located in the southern Vindhyan hill region, its rugged topography and rocky terrain limited agricultural expansion, preserving extensive tracts of Tropical Dry Deciduous Forests, diverse native tree species, and critical forest watershed zones.

38. (D) North-Eastern states
Shifting cultivation, locally known as Jhumming, is a traditional agricultural practice widely prevalent among indigenous communities in North-Eastern India. It involves clearing forest patches by cutting and burning vegetation, cultivating crops for a few seasons, and abandoning the land to restore soil fertility naturally. Shortened fallow cycles have made this practice a major driver of forest degradation and land erosion.

39. (B) Widespread severe forest fires caused by lightning strikes
Severe forest fires ignited naturally by lightning strikes represent a direct natural cause of rapid deforestation, timber loss, and habitat degradation. These intense fires consume vegetation canopy, destroy topsoil seed banks, and disrupt wildlife habitats across vast forest tracts. In contrast, urban development, agricultural expansion, and open-cast mining operations constitute human-driven anthropogenic drivers of deforestation rather than natural events.

40. (C) The fraction of incident solar radiation reflected by Earth
Surface albedo defines the fraction of incident solar radiation reflected back into space by the Earth surface. Forest canopies absorb significant solar radiation due to dark leaf surfaces, exhibiting low albedo. Deforestation replaces dense foliage with bare soil, dry pasture, or agricultural crops, increasing surface reflectance. This altered energy balance modifies local surface temperatures, microclimates, and regional atmospheric circulation patterns.

41. (D) It lowers evapotranspiration, reducing regional rainfall and elevating surface runoff levels
Deforestation significantly alters regional hydrology by removing deep-rooted trees that drive transpiration. Losing tree cover decreases atmospheric water vapour inputs, reducing local cloud formation and precipitation. Furthermore, removing protective canopy layers and root networks reduces rainwater infiltration, accelerating surface runoff, increasing topsoil erosion, elevating peak flood volumes, and lowering subterranean aquifer water recharge across affected river watersheds.

42. (A) Increased edge effects and higher vulnerability of core species
Ecological fragmentation caused by deforestation divides contiguous forest tracts into isolated patches, increasing perimeter-to-area ratios and creating pronounced edge effects. Forest edges experience altered microclimates, characterized by higher wind speeds, increased sunlight, and fluctuating humidity. These modified boundary conditions favor invasive generalist species while exposing specialized interior forest wildlife to increased predation, wind damage, microclimate stress, and genetic isolation.

43. (A) Bare rock → Lichens → Mosses → Annual herbs → Perennial grasses → Shrubs → Trees
Xerarch succession begins on dry, barren rock surfaces where crustose lichens initiate primary colonization by weathering substrate and accumulating minute organic dust. Mosses follow, trapping particles to form thin topsoil

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nutrient cycling. They consume dead leaf litter and organic debris, breaking down complex structures into smaller fragments. This physical shredding dramatically increases the available surface area for bacteria and fungi, accelerating microbial decomposition and ensuring rapid mineralization of essential inorganic nutrients back into topsoil.

27. (B) Ecological succession
Ecological succession is the process where ecological communities undergo predictable and directional species replacement over time following disturbance or bare soil formation. Early pioneer species alter light, moisture, and soil properties, creating favorable conditions for secondary species. This sequence progresses through intermediate seral stages until reaching a relatively stable climax community in long-term equilibrium with regional climatic conditions.

28. (B) Primary plant growth on fresh volcanic lava flows
Primary succession occurs on newly exposed substrates completely devoid of pre-existing organic soil, living organisms, or seed banks, such as cooled volcanic lava flows or retreating glaciers. Pioneer organisms like lichens gradually break down barren rock surfaces to build initial topsoil. In contrast, recovery following forest fires, farm abandonment, or timber clear-felling represents secondary succession on established soils.

29. (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
Tropical evergreen forests feature an extremely dense upper canopy that absorbs and reflects up to ninety-eight percent of incident sunlight. Consequently, the middle and lower forest strata receive limited solar radiation. Plant species inhabiting the middle storey have evolved specific physiological shade-tolerance adaptations, such as larger leaves and higher chlorophyll density, enabling effective photosynthesis under low light regimes.

30. (C) Climax community
A climax community represents the final, self-perpetuating stage of ecological succession that achieves long-term equilibrium with regional climate, soil conditions, and environment. Unlike transitional seral stages, species composition within a climax community remains stable over extended periods unless disturbed by major natural catastrophes or human interventions, maintaining balanced biomass, species diversity, and efficient energy flow across trophic levels.

31. (D) Ecological succession originating within an aquatic water body
Hydrarch succession is ecological succession that initiates in aquatic environments such as ponds, lakes, or marshes. Over time, organic sediment accumulation, root growth, and plant decomposition convert open water bodies into shallow wetlands. This hydric environment gradually transitions through reed-swamp and sedge-meadow stages, eventually forming a terrestrial mesic forest climax community balanced with the surrounding climate.

32. (C) 70% and above
The Forest Survey of India classifies forest cover into distinct density classes based on tree canopy closure observed through satellite imagery. Lands with tree canopy density of seventy percent and above are categorized as Very Dense Forest. This class represents pristine or well-managed forests featuring continuous canopy cover, superior biomass storage, rich biodiversity, and high soil conservation capacity.

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33. (B) Remote sensing via satellite imagery
The Forest Survey of India conducts biennial nationwide forest assessments primarily utilizing satellite-based remote sensing technology. Digital multi-spectral satellite imagery allows comprehensive mapping, monitoring, and classification of forest cover density across remote and inaccessible geographical terrain. Satellite data analysis is complemented by rigorous ground-truthing field validation to ensure accurate measurement of spatial forest dynamics, canopy density changes, and land use patterns.

34. (D) Scrub
Under the classification framework used by the Forest Survey of India, degraded forest lands or open vegetation with tree canopy density strictly below ten percent are designated as Scrub. These tracts typically feature stunted trees, thorny bushes, and degraded ground cover. Scrublands represent degraded ecosystems affected by severe soil erosion, biotic pressure, moisture stress, or historical overgrazing.

Because subterranean sediments lack sufficient oxygen for root respiration, these modified roots emerge above water levels. Covered with tiny porous lenticels, pneumatophores absorb atmospheric oxygen during low tide and transport it directly to subterranean root tissues, ensuring continuous cellular survival.

53. (A) Mangrove Forests
Vivipary is a specialized reproductive adaptation prominently observed in mangrove forest plant species like Rhizophora. Seeds germinate and develop into young seedlings while still physically attached to the parent tree, deriving water and nutrients directly from it. The heavy, elongated hypocotyl then drops vertically into soft mud or water, allowing rapid establishment in unstable, tidal intertidal saline environments.

54. (D) Attenuating wave energy from storm surges and reducing shoreline erosion
Mangrove forests serve as vital natural coastal defense buffers along tropical estuaries and shorelines. Their complex, dense networks of prop roots and pneumatophores create physical friction that significantly attenuates wave energy from ocean swells and storm surges. By trapping floating marine sediments and binding fine coastal mud, mangroves prevent severe shoreline erosion and protect low-lying inland coastal regions.

55. (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
Deforesting hilly watershed catchments severely disrupts hydrological balance and soil stability. Removing tree foliage eliminates canopy rainfall interception, while losing root networks reduces soil porosity and infiltration rates. Consequently, heavy precipitation cannot absorb into subterranean layers, converting quickly into high-velocity surface runoff that rapidly flows down mountain slopes, triggering destructive flash floods and heavy river siltation downstream.

56. (A) Tropical moist deciduous → Sub-tropical pine → Temperate broadleaf → Alpine scrub
Ascending the Himalayan mountain range presents distinct environmental gradients in temperature and precipitation, creating sequential vegetation zones. Warm foothills support Tropical Moist Deciduous Forests dominated by Sal. Higher sub-tropical elevations feature Chir Pine stands, transitioning up into moist Temperate Broadleaf Oak and Conifer forests. Finally, cold high-altitude zones near the snowline support dwarf Alpine Scrub and meadow communities.

57. (D) The upper elevation limit beyond which trees cannot survive
The timberline represents the maximum altitudinal boundary on mountain ranges beyond which environmental conditions become too extreme for tall tree growth. Above this elevation, short growing seasons, severe winter freezing, low mean summer temperatures, and physiological drought prevent erect tree survival. Vegetation transitions from sub-alpine forests into low-growing dwarf shrubs, alpine mats, herbs, and cold tundra meadows.

58. (A) Chir Pine (Pinus roxburghii)
Chir Pine is the dominant tree species in the Sub-tropical Pine Forests of the lower Himalayan range. It adapts to nutrient-poor, dry slopes, producing abundant resinous needle litter on the forest floor. These dry fallen needles contain volatile organic resin compounds that ignite easily during hot summer months, making these coniferous stands highly susceptible to frequent surface forest fires.

59. (B) The northern Terai and Bhabar forest tract
While historical Gangetic alluvial plains were originally covered by extensive broadleaf forests, human population growth and widespread agricultural clearance removed most native cover. Today, natural Tropical Moist Deciduous Forests in Uttar Pradesh are largely restricted to the continuous sub-Himalayan Terai and Bhabar northern belt. This moist linear tract benefits from adequate seasonal monsoon rainfall, high groundwater levels, and protective reserve status.

60. (B) P-3, Q-4, R-1, S-2
Specific human activities induce distinct ecological impacts on forest ecosystems. Open-cast mining causes total topsoil loss and toxic metal contamination. Livestock overgrazing compacts soil and destroys emerging natural seedlings. Linear infrastructure like highways fragments contiguous habitats, increasing wildlife mortality from vehicle collisions. Shifting cultivation involves periodic patch clearing and burning, leading to accelerated soil nutrient depletion over time.

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61. (A) The chemical inhibition of one plant species by another
Allelopathy is a biological phenomenon where a plant releases biochemical compounds, known as allelochemicals, into the surrounding environment to suppress neighboring species. Excreted through root exudates, leaf litter leachates, or volatile gas emissions, these toxic chemicals inhibit seed germination, root elongation, or growth of competing flora, securing light, moisture, and soil nutrient access for the donor plant species.

62. (C) Heavy, uncontrolled livestock grazing
Heavy, uncontrolled livestock grazing damages natural forest regeneration through multiple pathways. Moving animal herds physically trample upper soil layers, causing severe soil compaction that reduces pore space, aeration, and water infiltration. This degraded soil structure physically hinders root penetration by emerging seeds. Furthermore, grazing livestock directly consume or break young tree seedlings, preventing forest canopy replenishment and natural stand dynamics.

63. (D) Cut trees regenerate new shoots from the remaining stump or roots
Coppicing is a traditional silvicultural practice and vegetative propagation phenomenon where mature tree trunks are cut down near ground level, stimulating dormant buds on the remaining stump or root collar to produce multiple vigorous young shoots. This natural regenerative capacity allows sustainable production of small-diameter timber, poles, and fuelwood on short rotation cycles without replanting new seedlings.

64. (C) Quadrat method
The quadrat method is a standard quantitative sampling technique used in ecological field research to analyze plant community composition. Frame plots of fixed dimensions are laid out across representative forest sites to count individual species, calculate stem density, measure basal area, and assess species frequency. This standardized spatial sampling allows accurate statistical estimation of forest biodiversity, structure, and species distribution patterns.

65. (B) Vegetation density and health based on reflected light spectra
The Normalized Difference Vegetation Index is a widely utilized satellite remote sensing metric that quantifies green vegetation biomass and canopy vigor. It operates by measuring the contrast between absorbed red light, used by leaf chlorophyll during active photosynthesis, and reflected near-infrared light from cellular leaf structures. High index values correspond to dense, healthy canopy cover, enabling global monitoring of forest health.

66. (D) It shifts tree lines upward and latitudinal boundaries poleward
Rising global temperatures induced by climate change alter environmental conditions, causing forest biomes to shift geographically toward cooler thermal regimes. Elevated thermal limits force alpine tree lines to migrate upward to higher elevations on mountain ranges. Similarly, forest biome boundaries shift poleward toward higher latitudes as warmer conditions enable temperate and boreal species to colonize previously cooler geographic zones.

67. (A) I and II only
Forested watersheds regulate hydrological cycles by absorbing rainwater through canopy interception and organic soil litter, reducing peak surface runoff and downstream flooding. Deep tree root networks enhance soil permeability, facilitating groundwater infiltration into subterranean aquifers. Conversely, deforestation eliminates these vegetative sponges, causing increased surface runoff, accelerated soil erosion, and severe flash flooding rather than reducing overall annual watershed runoff.

68. (C) Shifts in timing of recurring plant life events like flowering
Phenology studies the timing of periodic biological events in response to seasonal climatic drivers. Climate warming alters temperature and moisture cues, causing noticeable phenological shifts in forest plants, such as earlier bud burst, advanced flowering, shifted leaf senescence, and modified fruit production cycles. These shifts can disrupt synchronized mutualistic relationships between forest plants and their natural insect pollinators or seed dispersers.

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69. (A) Lantana camara
Lantana camara is a high-impact invasive shrub introduced into India as an ornamental plant that has aggressively spread across native tropical forests. It forms dense impenetrable thickets, produces allelopathic chemicals, and outcompetes native understory vegetation for light, water, and soil nutrients. By suppressing native tree seedling establishment and altering natural fire regimes, it severely degrades forest ecosystem function.

70. (D) Arid and semi-arid tracts of Western and Central India
Prosopis juliflora, commonly called Vilayati Babul, is an invasive exotic tree species introduced into India for fuelwood production and land reclamation in dry areas. Possessing deep taproot systems, high drought tolerance, and aggressive coppicing ability, it has rapidly invaded native ecosystems across semi-arid and arid tracts of Western and Central India, supplanting indigenous flora and altering subterranean hydrology.

71. (B) Carbon sequestration and atmospheric regulation
Indirect use values of forest ecosystems derive from environmental functions and regulatory services that support economic activities without direct physical consumption. Carbon sequestration, watershed protection, climate regulation, and flood control represent primary indirect use values. In contrast, harvesting timber, gathering fuelwood, and collecting medicinal plants represent direct use values, as they involve extraction and physical consumption of natural forest resources.

72. (C) Value from knowing a forest exists without personal utilization
Existence value is a non-use economic value derived from the satisfaction of knowing a natural ecosystem or species exists and survives, independent of any current or future direct physical utilization by humans. Individuals value the preservation of pristine primary forests, rare wildlife, or sacred natural habitats purely for intrinsic, ethical, cultural, or bequest reasons without intention of visiting or resource extraction.

73. (D) Assisted Natural Regeneration methods
Assisted Natural Regeneration is an ecological restoration strategy that accelerates natural forest recovery on degraded lands by removing environmental stressors. Instead of planting nursery-raised saplings, managers protect native seed sources and emerging wild saplings from livestock grazing, forest fires, weed competition, and human disturbance. This cost-effective approach leverages inherent biological resilience to restore diverse native canopy cover naturally.

74. (A) State forest departments and local village communities
Joint Forest Management is an institutional conservation framework established in India that establishes formal partnerships between state forest departments and local rural communities. Under JFM agreements, local village committees actively participate in protecting, managing, and restoring degraded nearby state forest lands. In exchange, community members receive non-timber forest products and a share of financial revenue generated from harvested mature timber stands.

75. (A) II, IV, I, III
Forest litter decomposition follows a structured sequence of physical and biological transformations. Detritivores first initiate Fragmentation by shredding coarse leaf litter into smaller fragments. Water then drives Leaching, dissolving and carrying away soluble inorganic ions. Microorganisms subsequently perform Humification, synthesizing dark amorphous humus. Finally, Mineralization breaks down organic molecules, releasing simple inorganic nutrients into topsoil for root uptake.

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76. (B) Upright
The Pyramid of Energy in any stable ecosystem, including undisturbed forests, is always strictly upright. This fundamental ecological structure reflects the Second Law of Thermodynamics, where kinetic and chemical energy is lost as metabolic heat at every sequential trophic transfer. Consequently, primary producers hold the maximum energy content, while apex carnivores at higher trophic levels receive progressively smaller fractions.

primary production minus organic consumption lost through metabolic respiration and detrital shedding.

94. (C) P-1, Q-2, R-3, S-4
Vegetation in the Himalayas exhibits distinct altitudinal zonation corresponding to climate gradients. The lower Sub-tropical zone is dominated by Pinus species such as Chir Pine. Ascending into the Temperate zone reveals broadleaf Quercus oak species. Higher Sub-alpine zones feature Betula birch forests, which transition above into high-elevation Alpine scrub dominated by dwarf Rhododendron species along sub-alpine meadow borders.

95. (D) Species used to raise awareness and support conservation
A flagship species is a prominent, charismatic animal or plant chosen to anchor environmental awareness campaigns and mobilize public, political, and financial support for broader biodiversity conservation. Iconic species such as the Bengal Tiger, Giant Panda, or Asian Elephant attract public sympathy. Protecting their large habitat ranges indirectly conserves thousands of co-existing lesser-known flora, fauna, and specialized microhabitats within forest ecosystems.

96. (C) Progressive death of branches from tips inward
Dieback is a disease symptom or physiological condition in forest trees characterized by progressive mortality of shoots, twigs, and branches, starting from the outer crown tips and moving inward toward the main trunk. It is triggered by environmental stressors such as prolonged drought, severe soil compaction, waterlogging, nutrient deficiencies, atmospheric pollution, or fungal pathogen infections that weaken vascular water transport systems.

97. (B) Clear-felling System
The clear-felling system is a silvicultural harvesting method where all standing trees within a designated forest block are completely removed in a single operational logging process. This complete canopy removal opens the entire area to full overhead sunlight, creating an even-aged stand through artificial planting or uniform natural seeding. It favors fast-growing, light-demanding pioneer timber species requiring unshaded conditions for seedling establishment.

98. (D) The forest absorbs more carbon from air than it releases
A forest acts as a carbon sink when its net carbon intake through photosynthesis exceeds the total carbon released via plant respiration, microbial organic decay, and biomass combustion over a given period. By accumulating and storing atmospheric carbon dioxide in woody biomass, root systems, and soil organic matter, carbon-sink forests play an indispensable global role in dampening anthropogenic greenhouse gas accumulation.

99. (A) I and II only
The Terai region of Uttar Pradesh is characterized by alluvial flatlands with high water tables, creating moist, marshy soil conditions that support dense stands of tall elephant grasses. However, claims that the region lacks Sal are false; Sal broadleaf trees form extensive climax forests throughout the Terai belt, benefiting from rich alluvial moisture reserves and favorable sub-Himalayan growing conditions.

100. (C) Estimating tree density without physical plot boundaries
The Point-Quarter Method is a distance-based, plotless sampling technique widely used in forest mensuration and ecological surveys. By measuring distances from randomly selected sample points to the nearest trees within four quadrants, foresters accurately estimate stem density, basal area, and species dominance without constructing time-consuming fixed-area physical plots. This efficiently speeds up quantitative forest inventory assessments across extensive field landscapes.

101. (A) Ecotone
An ecotone is a physical transition zone between two distinct biological communities or ecosystems, such as the boundary area separating a dense forest from an open grassland. Exhibiting overlapping environmental conditions, ecotones often feature high species richness and population densities—a phenomenon known as the edge effect—hosting species native to both adjacent ecosystems as well as specialized edge-adapted organisms.

102. (D) The functional role and resource use of a species
An ecological niche describes the complete functional role, biological interactions, and

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85. (A) Ashoka (Saraca asoca)
Ashoka, scientifically known as Saraca asoca, holds official recognition as the state tree of Uttar Pradesh. Belonging to the Fabaceae family, this evergreen tree features dense foliage, fragrant flowers, and deep cultural heritage across India. Ecologically, its broad shade canopy provides shelter and nesting microhabitats for local avian and arboreal wildlife while helping regulate local microclimatic soil moisture conditions.

86. (D) Restricted naturally to a specific geographic region
Endemism describes the ecological state where a biological species is naturally restricted to a defined geographic location, such as a specific island, mountain range, or isolated forest biome, and exists nowhere else on Earth. Endemic species often evolve specialized ecological niches. Consequently, they are exceptionally vulnerable to localized habitat destruction, climate shifts, deforestation, and invasive non-native species competition.

87. (B) I, II, and IV only
Mangrove species adapt to harsh coastal environments by developing salt-excreting leaf glands, shallow spreading root structures for stability in unstable muds, and dense rot-resistant timber. However, mangroves do not reproduce exclusively through vegetative methods; instead, they produce true seeds that exhibit specialized vivipary, where seeds germinate into seedlings while remaining physically attached to the parent plant before dropping.

88. (C) Sulfur dioxide
Lichens are composite organisms formed by a symbiotic association between fungi and algae or cyanobacteria. Absorbing water and gaseous nutrients directly from air due to a lack of roots or protective cuticles, lichens are exceptionally sensitive to atmospheric sulfur dioxide pollution. High sulfur levels disrupt photosynthetic processes and chlorophyll structure, making lichen disappearance a widely recognized bioindicator of degraded forest air quality.

89. (D) Primary producers like trees and plants
Primary producers form the foundational first trophic level in all forest food webs. Green plants, broadleaf trees, shrubs, and mosses capture solar radiation and convert atmospheric carbon dioxide and water into energy-rich organic carbohydrates through photosynthesis. This synthesized autotrophic biomass supports all higher consumer levels, including primary herbivorous consumers, secondary carnivores, top predators, and detrital decomposition organisms throughout the ecosystem.

90. (A) Soil erosion increases nutrient runoff into water bodies
Deforestation removes protective tree canopy and binding root systems, exposing bare topsoil to heavy rainfall. Unchecked water erosion washes soil particles rich in agricultural nitrogen and phosphorus into adjacent lakes and rivers. This sudden influx of plant nutrients triggers rapid eutrophication, causing explosive algal blooms, light reduction, microbial oxygen consumption during decay, and severe hypoxia that threatens aquatic aquatic organisms.

91. (B) Coarse porous gravel soils where streams sink subterranean
The Bhabar tract is a narrow geographic belt situated immediately below the Shiwalik foothills in northern Uttar Pradesh. Composed of coarse sediments, loose boulders, and porous gravel deposits washed down from mountain slopes, it exhibits extremely high soil permeability. Consequently, small mountain streams disappearing from the surface seep underground through gravel layers, reappearing further south in the marshy Terai plain.

92. (B) Growing seasonal crops between rows of young trees
The Taungya system is an agroforestry method introduced in India during the nineteenth century to establish forest plantations cost-effectively. Local farmers are granted temporary cultivation rights to grow seasonal agricultural crops between widely spaced rows of young planted tree seedlings. In return for land access, farmers tend the emerging timber trees, control weed competition, and protect plantation stands until canopy closure occurs.

93. (A) The standing crop
The standing crop represents the total quantity of living biological organic matter, or biomass, present within a specified area of an ecosystem at a given point in time. Expressed as dry weight or energy content per unit area, it includes all primary producers, animals, and soil microorganisms, reflecting accumulated net

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77. (A) Symbiosis between fungi and vascular plant roots
Mycorrhizae represent a mutualistic symbiotic association formed between specialized soil fungi and the roots of vascular forest plants. Fungal hyphae extend far into topsoil, expanding the effective absorptive surface area of plant roots to absorb water and essential mineral nutrients like phosphorus. In return, the host plant supplies the non-photosynthetic fungal partner with organic carbohydrates synthesized through leaf photosynthesis.

78. (C) Commensalism
Epiphytic orchids inhabiting tropical forest canopies demonstrate commensalism, an ecological interaction where one species benefits while the other remains unaffected. The orchids anchor themselves onto high tree branches to access elevated sunlight, ambient moisture, and airborne nutrients. The host tree provides physical structural support without suffering structural harm, sap drainage, or metabolic nutrient loss, as orchids do not penetrate host living vascular tissues.

79. (D) Gross Primary Productivity (GPP)
Gross Primary Productivity represents the total amount of solar energy converted into chemical energy and fixed as organic carbon by photosynthetic primary producers per unit area over a specific timeframe. A fraction of this captured energy is subsequently metabolized by plants during cellular respiration, while the remaining stored organic carbon constitutes Net Primary Productivity available for herbivore consumption and biomass accumulation.

80. (D) Assertion (A) is false but Reason (R) is true.
In tropical forest ecosystems, high ambient temperatures and moist conditions accelerate organic decomposition, preventing significant humification accumulation. Microorganisms break down fallen litter so rapidly that organic carbon recycles almost instantly. However, humus itself consists of complex, dark organic polymers highly resistant to enzymatic degradation, causing synthesized humus molecules to undergo decomposition at extremely slow rates in soil profiles.

81. (B) Protecting forest patches driven by cultural and religious values
Sacred Groves are traditionally protected forest patches preserved by local indigenous communities through deeply rooted cultural beliefs and religious taboos. Deities associated with these groves prohibit tree felling, hunting, and resource extraction within boundaries. Consequently, sacred groves act as vital community-managed sanctuaries, preserving undisturbed climax vegetation, endemic flora, rare medicinal herbs, and localized soil water resources across fragmented landscapes.

82. (D) Shedding leaves during dry periods to reduce transpiration loss
Tropical dry deciduous trees survive extended seasonal drought by synchronized leaf shedding at the onset of dry summer months. Stomata on foliage account for the majority of plant water loss via transpiration. By dropping broad leaves during periods of low soil moisture, trees dramatically minimize transpiration, conserve internal water reserves, prevent vascular cavitation, and endure prolonged heat stress until monsoon rains arrive.

83. (A) Forest land is diverted for non-forest industrial or development uses
Compensatory Afforestation in India is legally mandated under the Forest (Conservation) Act when statutory forest land is cleared or diverted for non-forest purposes such as mining, dam construction, or infrastructure. Project developers must provide funding to establish alternative forest cover on equivalent non-forest land or degraded forest areas, offsetting the ecological loss of canopy cover, biodiversity, and ecosystem carbon storage.

84. (C) Facilitating animal dispersal between fragmented forest areas
A wildlife corridor is a continuous strip of natural vegetation connecting isolated forest reserves or protected habitats. By bridging fragmented landscapes, corridors allow wild animals to disperse safely, forage across larger seasonal ranges, migrate, and interbreed with neighboring populations. Facilitating genetic exchange across separated habitat patches reduces inbreeding depression, enhances population viability, and preserves long-term ecosystem resilience.

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resource utilization of a species within its ecosystem. It encompasses not only physical habitat location but also trophic position, environmental tolerance limits, foraging behaviors, and timing of activity. Understanding a species niche reveals how it coexists with competing organisms, exploits available resources, and contributes to broader forest ecosystem dynamics.

103. (B) Two species cannot occupy the exact same niche indefinitely
Gause's Principle of Competitive Exclusion states that two species competing for identical limited resources cannot stably coexist in the same ecological niche indefinitely. The species with superior competitive efficiency will eventually outcompete and eliminate or replace the other. To avoid extinction, coexisting species in stable forest ecosystems must evolve resource partitioning strategies or shift their functional ecological niches over evolutionary time.

104. (C) Podzolization
Podzolization is a pedogenic soil formation process prevalent in cool, humid temperate and boreal coniferous forests. Acidic organic needle litter decomposes slowly, releasing organic acids that leach iron and aluminum oxides from upper soil horizons. This intensive downward leaching creates a distinct, highly leached, acidic, ash-grey silica-rich surface horizon underlain by a dark, nutrient-rich accumulation zone in lower soil layers.

105. (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
Habitat fragmentation poses a severe extinction risk to large mammalian carnivores like tigers. Apex predators require extensive continuous forest territories to support sufficient wild prey populations and avoid territorial conflicts. Fragmenting forests into small isolated patches limits home ranges, increases edge encounters with human settlements, restricts mate search, and restricts gene flow, inducing severe inbreeding depression and population collapse.

106. (A) Total species diversity across a broad landscape
Gamma diversity measures overall species diversity across large regional landscapes encompassing multiple distinct ecosystems or habitats. It integrates local species richness within individual habitats (alpha diversity) with the rate of species replacement or turnover observed between those habitats (beta diversity). Evaluating gamma diversity provides macro-scale spatial insights critical for designing regional conservation networks, biosphere reserves, and landscape-level biodiversity strategies.

107. (B) Supply of timber, medicinal plants, and food
Provisioning services are tangible material products harvested directly from ecosystems for human consumption or industrial use. Forests provide critical provisioning services including timber, fuelwood, non-timber products, medicinal herbs, clean freshwater, and wild food sources. In contrast, water purification and carbon storage represent regulating services, while eco-tourism, spiritual values, and cultural heritage fall under non-material cultural ecosystem services.

108. (B) The microbial organic decomposition rate
The Carbon to Nitrogen ratio of forest litter is a fundamental determinant of organic decomposition velocity in topsoil. Microorganisms require nitrogen to synthesize proteins while digesting organic carbon substrates. Low C:N ratios provide balanced nutrition, enabling rapid microbial population growth and litter decay. High C:N ratios constrain microbial activity, slowing decomposition, immobilizing bioavailable soil nitrogen, and causing leaf litter accumulation.

109. (A) Slower, due to microbial nitrogen limitation
Forest litter with a very high C:N ratio, such as coarse woody debris and pine needles, undergoes slow microbial decomposition. Decomposers like bacteria and fungi require adequate nitrogen to build cellular proteins while metabolizing carbon compounds. Lacking sufficient nitrogen in woody litter, microorganisms immobilize ambient bioavailable soil nitrogen, significantly slowing decay rates until nitrogen accumulates or carbon is lost via respiration.

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110. (C) Temperate grassland Mollisols and Alfisols
Mollisols and Alfisols are fertile soil orders characterized by deep, dark, organic-rich topsoil layers formed under temperate grassland and deciduous forest vegetation. Seasonal root turnover and moderate rainfall promote humus accumulation without excessive leaching. In tropical rainforests, however, continuous high

to measure willingness to pay for non-market environmental goods. The Travel Cost Method values recreational benefits based on visitor travel expenditures. Hedonic pricing estimates aesthetic amenities through local real estate property values, while the Market Price Method directly measures commercial commodities like timber in active markets.

128. (C) Biosphere Reserves allow human use; National Parks prohibit exploitation
The fundamental difference between a National Park and a Biosphere Reserve lies in human management intensity and land use regulations. National Parks are strictly protected zones dedicated to wildlife conservation where commercial resource extraction, forestry operations, grazing, and human settlements are legally prohibited. In contrast, Biosphere Reserves incorporate protected core zones alongside flexible buffer and transition zones supporting sustainable human resource use.

129. (B) Shock absorbers regulating adjacent human activities
Eco-Sensitive Zones are designated buffer belts declared around National Parks and Wildlife Sanctuaries under environmental protection legislation. ESZs act as protective shock absorbers, transitionally absorbing peripheral environmental impacts. They regulate high-impact commercial developments, industrial expansion, mining, and heavy urban infrastructure nearby, ensuring that human activities do not fragment wildlife corridors or cause habitat degradation inside sensitive protected core ecosystems.

130. (D) Zone where management and communities work sustainably
The Transition Zone, or area of cooperation, forms the outermost boundary region of a Biosphere Reserve. In this flexible management zone, local communities, resource managers, agricultural producers, and conservation scientists collaborate to foster sustainable economic development, traditional agriculture, eco-tourism, and social land use practices aligned with regional ecological conservation goals and biodiversity preservation principles.

131. (A) Forest Range
Within the administrative hierarchy of the Uttar Pradesh Forest Department, state forest territories are managed through structured operational units. A Forest Circle is divided into Forest Divisions, which are further subdivided into Forest Ranges managed by Range Forest Officers. Ranges are subsequently partitioned into smaller administrative units called Sections and Beats to ensure effective local forest protection, patrolling, and management.

132. (C) Biomagnification
Biomagnification is the process whereby non-biodegradable, fat-soluble toxic substances—such as synthetic pesticides or heavy metals—become progressively more concentrated in organism tissues at successively higher trophic levels within a food web. Primary producers absorb toxins from topsoil, which are ingested by herbivores and carnivores. Apex predators retain cumulative toxin burdens, suffering severe reproductive failure, physiological damage, or mortality.

133. (A) Decomposers
Decomposers, primarily comprising specialized bacteria and soil fungi, prevent the excessive buildup of dead organic matter in forest ecosystems. By secreting digestive enzymes, these heterotrophic microorganisms systematically break down fallen leaves, woody debris, and animal carcasses into simple organic molecules and inorganic minerals. This active decomposition maintains forest hygiene, recycles carbon, and returns essential nutrients to the soil.

134. (D) Long, severe winters and short, cool summers in subarctic regions
Boreal Forests, or Taiga, are natively situated across high-latitude subarctic regions of the Northern Hemisphere. These extensive coniferous forest biomes adapt to harsh continental climates featuring long, extremely severe winters with freezing temperatures and short, cool summers. Coniferous evergreens like spruce, fir, larch, and pine dominate this biome, possessing needle-like leaves and conical shapes to endure heavy snow accumulation.

135. (B) Symbiosis with ants providing plant protection and food exchange
Myrmecophily describes a specialized mutualistic symbiotic interaction between plants and ants, commonly observed in tropical forest ecosystems. Specialized plant species provide nesting structures, such as hollow thorns or

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119. (B) Dormant viable seeds stored naturally in topsoil layers
A soil seed bank consists of viable, dormant seeds stored naturally within topsoil and leaf litter across forest floors. Produced by canopy trees, shrubs, and herbs over consecutive years, these buried seeds remain quiescent until environmental triggers—such as light exposure from canopy gaps, fire heat, or moisture changes—stimulate germination. Seed banks drive natural secondary succession and forest regeneration following disturbances.

120. (C) Monoclimax Theory
The Monoclimax Theory, formulated by Frederic Clements, posits that given sufficient time, all ecological succession within a geographic climate region converges toward a single, uniform climax community determined strictly by macroclimate. Regardless of initial soil variations, topography, or parent material, Clements argued that climate eventually overcomes local substrate differences, establishing a regional climatic climax community in long-term equilibrium.

121. (D) Promoting public tree planting and eco-awareness
Van Mahotsav, initiated in 1950 by K. M. Munshi, is an annual week-long tree-planting festival celebrated across India, including Uttar Pradesh. Its primary objective is to build public environmental awareness, mobilize mass community participation in tree planting, expand tree cover outside forest boundaries, and highlight the ecological importance of forests in mitigating climate change, preventing soil erosion, and supporting sustainable livelihoods.

122. (A) Trees of diverse sizes and ages form a multi-layered canopy
An uneven-aged forest stand contains trees belonging to three or more distinct age classes, resulting in a complex structural vertical profile. Continuous recruitment and variable growth rates create a multi-layered canopy with diverse trunk diameters, tree heights, and canopy depths. This structural heterogeneity provides varied microhabitats, enhances forest resilience against pest outbreaks, and supports rich ecological niche diversity across all strata.

123. (B) Biomass
Biomass refers to the total dry mass of living organic material present within a designated area or ecosystem volume at a specific time. In forest ecology, biomass measurements quantify accumulated organic carbon across primary producers, root systems, understory vegetation, fauna, and soil microorganisms. Measuring forest biomass provides essential data for assessing primary biological productivity, forest ecosystem health, and global carbon storage capacities.

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124. (B) Energy loss at each trophic transfer limits food chain length
Forest food chains are restricted to four or five trophic levels due to the thermodynamic inefficiency of ecological energy transfer. Governed by Lindeman's ten percent law, approximately ninety percent of available energy is dissipated as metabolic heat and waste during each sequential trophic transfer. Consequently, higher trophic levels receive insufficient residual energy to sustain viable, self-perpetuating populations of apex carnivores.

125. (B) Convergent evolution
Convergent evolution occurs when distantly related or phylogenetically independent organisms independently evolve similar anatomical structures, physiological adaptations, or ecological roles in response to similar environmental selective pressures. In geographically separated forest biomes with matching climatic conditions, unrelated plant or animal species frequently evolve strikingly similar traits, such as succulent water storage tissues or gliding membranes, to occupy equivalent ecological niches efficiently.

126. (C) Visiting field sites to verify satellite imagery data
Ground truthing is an essential validation procedure in remote sensing where researchers collect direct field measurements and observational data on the ground at specific geographic coordinates. Comparing field observations of tree species, canopy density, and land cover against classified satellite imagery allows scientists to evaluate mapping accuracy, calibrate remote sensing algorithms, correct spectral misclassifications, and produce reliable forest cover maps.

127. (D) P-3, Q-1, R-4, S-2
Economic valuation of forest ecosystem services employs diverse economic methodologies. Contingent valuation uses structured surveys

144. (C) Both species richness and relative species evenness
The Shannon-Wiener Index is a quantitative ecological metric widely used to evaluate community biodiversity. It incorporates two major dimensions of species diversity: species richness, which counts the total number of species present, and relative species evenness, which assesses the proportional abundance distribution among individual species. Higher index values reflect greater habitat complexity, community stability, and structural ecosystem diversity.

145. (B) Highly acidic, heavily leached, and nutrient-poor
Soils in humid tropical rainforests are typically deeply weathered, highly acidic, heavily leached, and nutrient-poor, classified as Oxisols or Ultisols. High annual rainfall continuously leaches soluble mineral nutrients like calcium and potassium into deep subterranean aquifers. Most ecosystem nutrients are held within living plant biomass and decomposing organic surface litter rather than bound within mineral soil profiles.

146. (D) Tolerating harsh conditions to colonize barren land
A pioneer species is an organism that initiates ecological succession by colonizing newly exposed, barren, or severely disturbed land surfaces devoid of pre-existing soil. Characterized by high seed dispersal capability, rapid growth rates, short life cycles, and high physiological tolerance for harsh microclimates, high sunlight, and nutrient-poor substrates, pioneers gradually modify soil conditions, facilitating subsequent secondary species establishment.

147. (A) Lichens and cyanobacteria
Lichens containing cyanobacterial photobionts play a critical biological role during the pioneer stages of primary ecological succession on bare rock surfaces. These specialized organisms perform biological nitrogen fixation, converting inert atmospheric nitrogen gas into bioavailable organic compounds. As lichens weather rock and decompose, they contribute initial organic matter and essential nitrogen to emerging topsoil, enabling subsequent herb colonization.

148. (C) Regional temperature and precipitation patterns
Regional macroclimate, specifically the seasonal interaction of temperature and precipitation, is the single most influential factor governing the global distribution of major forest biomes. Mean annual temperature and total precipitation dictate water availability, thermal growing seasons, and evaporation rates. These climatic parameters determine whether a region supports tropical rainforests, temperate broadleaf stands, boreal coniferous taiga, or semi-arid scrublands.

149. (A) The Emergent layer
In tropical rainforest vertical stratification, giant, widely spaced trees that push above the continuous canopy layer are termed emergent trees. Reaching heights over fifty meters, these tall trees withstand intense direct solar radiation, high wind speeds, and fluctuating humidity levels. Emergent species possess thick waxy leaves and heavy buttress roots, providing unique nesting microhabitats for birds and climbing fauna.

150. (D) Buttress roots
Buttress roots are massive, widened wooden roots that radiate outward from the base of tall emergent trees in tropical rainforests. Because tropical soils are shallow, heavily leached, and nutrient-poor, deep taproots cannot develop effectively. Buttress roots extend laterally across topsoil layers, providing physical structural stability against strong upper-canopy winds while maximizing absorption of nutrients from surface litter decay.

151. (B) Sant Ravidas Nagar
According to the India State of Forest Report 2021, Sant Ravidas Nagar (Bhadohi) district holds the lowest total area under forest cover in Uttar Pradesh. Located in the densely populated Gangetic plain, intensive land conversion for agricultural cultivation and urban settlement has reduced tree cover significantly, leaving minimal recorded forest area within the entire administrative boundaries of the district.

152. (C) Tropical Rainforests
Lianas are thick, woody perennial climbing vines characteristically abundant in tropical rainforest ecosystems. Ground-rooted in topsoil, lianas utilize tall canopy trees as structural supports to climb upward toward high light environments in the upper canopy. Lianas bridge tree crowns, forming physical canopy pathways for arboreal wildlife while competing with host trees for solar light, water, and soil nutrients.

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domatia, alongside nutrient-rich food rewards like extrafloral nectar. In exchange, resident ant colonies aggressively defend the host plant against leaf-chewing herbivorous insects, competing encroaching vines, and parasitic fungal pathogens.

136. (C) Core Zone → Buffer Zone → Transition Zone
Biosphere Reserves are structured into three concentric functional zones moving outward from the interior. The innermost Core Zone is strictly protected to conserve biodiversity and conduct non-destructive research. Surrounding this is the Buffer Zone, designated for educational activities, eco-tourism, and sustainable research. The outermost Transition Zone supports sustainable community development, traditional agriculture, and collaborative natural resource management.

137. (D) Uttar Pradesh Forest Corporation
The Uttar Pradesh Forest Corporation is a statutory state enterprise established to manage the commercial harvesting, processing, and marketing of forest produce in Uttar Pradesh. It oversees scientific timber logging, collection and trade of tendu leaves for eco-friendly economic development, and sale of non-timber forest resources, eliminating private contractor exploitation while ensuring fair revenue generation for state forestry development.

138. (A) Palash (Butea monosperma)
Palash, scientifically named Butea monosperma, is the official state flower of Uttar Pradesh, widely recognized as Flame of the Forest. Dominant across dry deciduous forests, it produces brilliant massed bright orange-red flowers during late winter and early spring. Ecologically, Palash improves degraded soil through nitrogen fixation, provides seasonal nectar for birds and insects, and yields natural dye products.

139. (A) I and II only
In-situ conservation protects species in their natural habitats within national parks or sanctuaries, while ex-situ conservation preserves biological diversity outside natural ranges using botanical gardens, seed banks, and zoos. Captive breeding programs involve managed reproduction within controlled artificial facilities outside natural wild habitats, making them an ex-situ conservation strategy rather than an in-situ conservation approach.

140. (B) Reduced natural regeneration of harvested plant species
Over-harvesting non-timber forest products, particularly seeds, fruits, and wild flowers, severely impairs natural plant regeneration. Removing excessive fruit biomass depletes the soil seed bank and deprives native fauna of primary food sources. Lacking adequate seed dispersal and seedling recruitment, target plant populations exhibit altered age structures, reduced genetic diversity, and long-term population declines across forest ecosystems.

141. (A) Creating windbreaks to protect fields from wind erosion
Shelterbelts are dense rows of planted trees and shrubs positioned perpendicular to prevailing wind directions along agricultural and coastal land boundaries. Acting as physical windbreaks, shelterbelts reduce wind velocity across ground surfaces, thereby preventing topsoil wind erosion, lowering crop evapotranspiration, protecting delicate agricultural plants, retaining soil moisture, and stabilizing microclimatic conditions in exposed agricultural landscapes.

142. (C) Ecological imbalance from monocultures or climate stress
Sudden insect defoliator outbreaks indicate underlying ecological imbalance within forest ecosystems, frequently triggered by monoculture plantations, extreme climate stress, or loss of natural predators. Single-species stands provide abundant uniform food sources without structural barriers, allowing pest populations to explode exponentially. This widespread defoliation weakens trees, disrupts canopy energy production, and reduces overall forest stand resistance to secondary disease pathogens.

143. (D) The maximum population size a habitat can support sustainably
Carrying capacity represents the maximum population size of a specific wildlife species that a given forest habitat can sustainably support over time without environmental degradation. It is determined by limiting environmental factors, including food availability, clean water access, canopy shelter, nesting space, and predation pressure. Exceeding carrying capacity leads to habitat degradation, resource depletion, increased mortality, and eventual population collapse.

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temperatures and heavy precipitation cause rapid microbial litter consumption and intense mineral leaching, preventing thick humic surface horizon formation.

111. (D) Plant evapotranspiration process
Evapotranspiration is the combined hydrological process representing total water movement into the atmosphere via direct evaporation from soil and canopy foliage surfaces, alongside plant transpiration through leaf stomata. In dense forest ecosystems, evapotranspiration transfers massive volumes of ground moisture into the atmosphere, maintaining atmospheric humidity levels, driving local cloud formation, influencing regional rainfall patterns, and regulating microclimatic thermal regimes.

112. (C) They intercept rain, reducing impact energy on the soil
Dense forest foliage structures intercept falling raindrops, absorbing kinetic energy and slowing water delivery to the ground surface. Water then drizzles gently as throughfall or stems down trunks, preventing high-velocity droplet impacts that break soil aggregates. By cushioning rainfall impact, canopy coverage maintains topsoil porosity, reduces particle detachment, prevents surface crusting, enhances rainwater infiltration, and protects forest watersheds from erosion.

113. (B) Water running down tree trunks to the soil surface
Stemflow is the hydrological process where intercepted precipitation drains along leaves and branches down main tree trunks to the ground surface. This concentrated flow delivers water and dissolved canopy nutrients directly to the root zone surrounding individual tree bases. Stemflow plays a vital role in forest hydrology, enhancing localized soil moisture retention and feeding subterranean root system networks efficiently.

114. (D) Complete parasitism
Cuscuta, commonly known as Dodder, is an obligate parasitic plant lacking functional roots and chlorophyll. It attaches to host forest plants using specialized stem structures called haustoria, which penetrate the host vascular tissues. Cuscuta extracts all required water, carbohydrates, and mineral nutrients directly from the host plant xylem and phloem, causing host weakening, reduced growth, and potential death.

115. (A) Chambal and Yamuna river basin areas
The Chambal and Yamuna river basin areas in south-western Uttar Pradesh feature extensive, deeply eroded ravine systems known as badlands. Historical deforestation, fragile alluvial soils, and intense seasonal surface runoff have cut deep gullies into the landscape. Managing these degraded ravines requires specialized soil conservation, check dam construction, gully plugging, and systematic afforestation using hardy drought-tolerant tree species.

116. (C) Free-living and symbiotic nitrogen-fixing bacteria
Biological Nitrogen Fixation in forest soils is driven primarily by specialized prokaryotic microorganisms. Symbiotic bacteria such as Rhizobium live within root nodules of leguminous trees, while free-living or associative bacteria like Azotobacter, Beijerinckia, and Frankia inhabit topsoil. These organisms possess nitrogenase enzymes capable of reducing atmospheric inert nitrogen gas into bioavailable ammonia, enriching soil fertility and supporting forest biomass growth.

117. (B) I, II, and IV only
Natural forest regeneration faces serious physical and biological barriers. Thick undecomposed leaf litter layers physically prevent seeds from reaching mineral soil, heavy livestock grazing consumes emerging seedlings, and recurring ground fires destroy fragile seed banks. However, complete absence of sunlight inhibits light-demanding pioneer species rather than favoring them, as pioneers require high solar radiation levels to germinate and grow vigorously.

118. (D) LiDAR
Light Detection and Ranging is an advanced active remote sensing technology that emits rapid laser pulses toward the Earth surface to measure precise ranges. By analyzing returning laser reflections, LiDAR generates highly accurate three-dimensional structural models of forest canopy heights, vertical branch density, understory layers, and underlying ground topography. It enables precise estimation of aboveground forest biomass and canopy structural complexity.

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153. (D) Regulation of local climate and diseases
Regulating services are ecological benefits obtained from the natural regulation of ecosystem processes. In forest ecosystems, these include climate regulation via carbon sequestration, regional hydrological flow moderation, soil erosion control, natural flood attenuation, and disease regulation through pest population control. In contrast, timber represents a provisioning service, while eco-tourism and sacred traditions represent non-material cultural ecosystem services.

154. (A) Tracking wildlife movement using collars
Telemetry, particularly radio and satellite telemetry, is a modern technology widely utilized in forest ecological research to track individual wild animals remotely. Biologists fit animals with lightweight transmitters or GPS collars that broadcast position signals to receivers or satellites. This enables continuous monitoring of wildlife movement corridors, home range boundaries, habitat preference, seasonal migration routes, and animal behavior patterns.

155. (B) Resource partitioning
Resource partitioning is an evolutionary process where competing species occupying the same habitat adapt to utilize limited environmental resources in different ways, times, or spatial locations. By foraging at different canopy heights, feeding on varied prey sizes, or remaining active at different times of day, sympatric species minimize direct competitive exclusion, permitting stable coexistence within complex forest communities.

156. (B) Biological nitrogen fixation
Biological nitrogen fixation is the biological pathway where specialized soil prokaryotes convert inert atmospheric nitrogen gas into reactive chemical forms like ammonia. Driven by nitrogenase enzymes in free-living soil bacteria or symbiotic bacteria residing in root nodules, this chemical transformation transforms inaccessible atmospheric nitrogen into plant-available nutrients, serving as a primary driver of soil fertility and forest biomass production.

157. (A) Low rainfall and periodic fires
Natural grassland ecosystems such as savannas and steppes are maintained primarily by low, highly seasonal annual rainfall combined with frequent periodic fires. Extended dry periods create moisture stress that limits tree seedling survival and canopy development. Periodic grass fires destroy emerging woody saplings while fire-adapted perennial grasses rapidly regenerate from subterranean roots, effectively suppressing forest establishment across these biomes.

158. (C) Reserve, Protected, and Village forests
The Indian Forest Act of 1927 provides the statutory legal framework for state forest management in India, categorizing forest lands into Reserve Forests, Protected Forests, and Village Forests. Reserve Forests enjoy the highest legal protection, where all human activities are prohibited unless explicitly permitted. Protected Forests allow public access unless restricted, while Village Forests are managed by local communities.

159. (D) High altitudes of the Western Ghats
Shola forests are unique tropical montane evergreen forest patches found sheltered in high-altitude valleys and depressions amidst rolling grasslands in the Western Ghats of Southern India, particularly across the Nilgiri, Anamalai, and Palani hill ranges. Characterized by stunted dwarf broadleaf trees, thick moss foliage, and high endemic biodiversity, Shola ecosystems depend on high elevation humidity and cloud cover.

160. (C) An intermediate stage of succession
A seral community, or sere, represents an intermediate developmental stage in ecological succession progressing from initial pioneer colonization toward a climax community. Seral communities exhibit directional changes in species composition, structural complexity, soil organic matter accumulation, and biomass. As seral organisms modify local light and soil conditions, they create favorable microenvironments for subsequent species to colonize and replace them.

161. (C) 1.37 meters
Diameter at Breast Height is the standard forestry metric used worldwide to measure the trunk diameter of standing trees. In India and many countries, DBH is conventionally measured at precisely one point three seven meters (four point five feet) above ground level on the uphill side of the tree, providing a consistent, ergonomic baseline for calculating timber volume and stand basal area.

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III. It completely eliminates the need for any water irrigation.
IV. It helps in controlling weed proliferation.
Which of the given statements are correct?
(A) I, II and III
(B) I, II and IV
(C) II, III and IV
(D) I, III and IV

21. Which of the following is the most accurate definition of a crop cycle (crop rotation)?
(A) Continuously growing the exact same crop on the same plot of agricultural land year after year
(B) Growing different crops in a planned sequence on the same plot of land over time
(C) Simultaneously cultivating two or more distinct crop species together in the very same field
(D) Completely abandoning agricultural land and leaving it entirely barren for an extended decade

22. What is the primary objective of adopting a scientifically planned crop cycle?
(A) To maximize the systematic extraction of a single primary nutrient from the topsoil layer
(B) To ensure the maximum possible application and heavy usage of synthetic chemical pesticides
(C) To sustain land productivity and minimize ecological degradation
(D) To promote large-scale monoculture agricultural practices continuously across the entire country

23. How does crop rotation inherently assist in weed control?
(A) Rotating crops alters soil toxicity to systematically poison and destroy all dormant weed seeds in the ground
(B) Crop rotation ensures the soil remains completely dry throughout the year, thereby permanently stopping weed growth
(C) Weeds are physiologically incapable of growing in agricultural fields unless chemical fertilizers are totally absent
(D) Different crops have varied weed associations, preventing any single weed species from dominating the field

24. Which of the following is a direct benefit of including a fallow period in a crop cycle?
(A) It allows the soil to naturally recover its structural integrity and moisture.
(B) It drastically and rapidly increases the immediate net financial income generated by the farm owner.
(C) It significantly accelerates the rapid depletion of critical soil organic carbon and micro-nutrients.
(D) It completely prevents groundwater recharge by forming an impenetrable crust over the surface.

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25. Match the items in List I with those in List II and select the correct option:
List I: (Cropping System Terminology)
P. Monoculture
Q. Multiple Cropping
R. Mixed Cropping
S. Intercropping
List II: (Definition)
1. Growing two or more crops simultaneously with distinct row arrangement
2. Growing two or more crops simultaneously without distinct row arrangement
3. Growing two or more crops in succession on the same land in a year
4. Growing the same crop on the same land year after year
(A) P-4, Q-3, R-2, S-1
(B) P-4, Q-2, R-3, S-1
(C) P-3, Q-4, R-1, S-2
(D) P-1, Q-2, R-3, S-4

26. According to the scientific principles of crop rotation, a deep-rooted crop should ideally be followed by:
(A) Another deep-rooted crop
(B) A shallow-rooted crop
(C) A perennial tree crop
(D) A weed crop

27. Why is it scientifically recommended to plant a leguminous crop after a non-leguminous grain crop?
(A) Legumes help in restoring the nitrogen depleted by the non-leguminous crop.
(B) Legumes extract excessive accumulated nitrogen from the root zone, thereby rapidly balancing overall soil pH.
(C) Non-leguminous crops leave the topsoil highly toxic, creating severe conditions that only legumes can survive.
(D) Legumes require absolutely zero irrigation water throughout their life, dramatically

mineral-exposed soil. Fire heat eliminates competing understory growth, triggering optimal seedling regeneration conditions.

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practiced on wooden rafts in the waters of Dal Lake

36. Which index is used to measure the efficiency of a multiple cropping system in terms of land use over a year?
(A) Harvest Index
(B) Crop Rotation Intensity
(C) Leaf Area Index
(D) Cropping Intensity

37. Uttar Pradesh consistently holds a dominant position in the production of which of the following commercial crops in India?
(A) Tea
(B) Sugarcane
(C) Jute
(D) Coffee

38. Which geographical region of Uttar Pradesh is considered the most productive for wheat cultivation?
(A) The Bundelkhand plateau
(B) The Vindhyan region
(C) The Ganga-Yamuna Doab
(D) The Tarai region exclusively

39. Sugarcane in Uttar Pradesh is generally planted during which two main seasons?
(A) Peak Winter and Peak Summer
(B) Late Summer and Monsoon
(C) Autumn and Winter
(D) Spring and Autumn

40. Consider the following statements regarding paddy cultivation in Uttar Pradesh:
I. Paddy is primarily cultivated as a Kharif crop in the state.
II. The eastern and central regions of UP are major contributors to its paddy production.
III. Paddy requires well-drained, sandy soils with low water retention capacity for optimum yield.
Which of the given statements is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II and III

41. The Tarai region of Uttar Pradesh is highly suitable for the cultivation of sugarcane and paddy primarily because of:
(A) High altitude, mountainous terrain, and persistent cool climate conditions
(B) High water table and fertile alluvial soil
(C) Arid climate, extreme temperature variations, and rocky unfertile terrain
(D) Highly weathered laterite soil structure accompanied by low annual rainfall

42. Which fungal disease is notoriously known as the "cancer of sugarcane" and causes significant economic loss to farmers in Uttar Pradesh?
(A) Powdery mildew
(B) Red rot
(C) Late blight
(D) Yellow vein mosaic

43. What is the ideal temperature range required for the proper germination of wheat seeds during the sowing period in Uttar Pradesh?
(A) 5 to 10 degree Celsius
(B) 20 to 25 degree Celsius
(C) 30 to 35 degree Celsius
(D) 35 to 40 degree Celsius

44. PBW 343 and HD 2967 are popular high-yielding varieties of which major crop grown extensively in Uttar Pradesh?
(A) Sugarcane
(B) Paddy
(C) Wheat
(D) Mustard

45. Arrange the following outcomes of soil degradation due to continuous monoculture in the correct sequential order of their occurrence:
I. Drastic reduction in soil microbial activity
II. Continuous depletion of specific nutrients from the root zone
III. Overall decrease in crop yield despite increased chemical fertilizer application
IV. Breakdown of soil structure and increased compaction
Select the correct order from the options given below:
(A) II, I, IV, III
(B) I, II, III, IV
(C) IV, III, II, I
(D) II, IV, I, III

46. The scientific phenomenon where continuous cultivation of the same crop leads to severe depletion of particular soil nutrients is termed as:
(A) Nutrient immobilization
(B) Soil solarization
(C) Nutrient mining
(D) Biological magnification

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9. Shifting cultivation, a primitive form of subsistence farming, is known by which local name in the North-Eastern states of India?
(A) Milpa
(B) Jhumming
(C) Bewar
(D) Podu

10. Consider the following statements regarding subsistence and commercial farming:
I. Subsistence farming relies heavily on manual labour and traditional tools.
II. Commercial farming generally involves a lower degree of mechanization than subsistence farming.
III. Yield per hectare is usually optimized in commercial farming through high-yielding variety seeds and chemical fertilizers.
Which of the given statements is/are correct?
(A) I and II only
(B) I and III only
(C) II and III only
(D) I, II and III

11. In contrast to subsistence farming, commercial farming is characterized by which of the following?
(A) High capital investment and large landholdings
(B) Production entirely consumed by the local village
(C) Use of exclusively organic manure and traditional seeds
(D) Complete absence of hired labour

12. Which of the following crops is primarily grown as a commercial crop rather than a subsistence crop in India?
(A) Pearl millet (Bajra)
(B) Finger millet (Ragi)
(C) Cotton
(D) Sorghum (Jowar)

13. During which months are Kharif crops generally sown in India?
(A) October to December
(B) March to May
(C) January to February
(D) June to July

14. Which of the following is a prominent Rabi crop?
(A) Paddy
(B) Maize
(C) Mustard
(D) Cotton

15. What type of crops are typically grown during the Zaid season?
(A) Long-duration cereal crops requiring extensive seasonal growth
(B) Short-duration crops such as watermelons, melons, and cucumbers
(C) Frost-resistant leguminous fodder crops grown during cold snaps
(D) Heavy water-requiring annual cash crops such as sugarcane

16. Identify the incorrectly matched pair of crop and its agricultural season.
(A) Wheat - Rabi
(B) Groundnut - Kharif
(C) Soybean - Kharif
(D) Barley - Zaid

17. The harvesting of Rabi crops in North India typically coincides with which festival?
(A) Baisakhi
(B) Diwali
(C) Dussehra
(D) Raksha Bandhan

18. Why can rice be grown in all three agricultural seasons in certain southern and eastern coastal states of India?
(A) Due to the persistent availability of heavy frost and freezing weather throughout the year
(B) Because rice crops require remarkably low amounts of water in these particular coastal belts
(C) Due to warm year-round temperatures and assured irrigation facilities
(D) Due to the exclusive widespread use of genetically modified drought-resistant dryland rice varieties

19. Kharif crops are generally classified based on their photoperiodic requirements as:
(A) Short-day plants
(B) Long-day plants
(C) Day-neutral plants
(D) Frost-dependent plants

20. Consider the following statements about the importance of crop rotation:
I. It helps in maintaining and enhancing soil fertility.
II. It disrupts the life cycles of pests and diseases.

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56. Which of the following is a fundamental principle of organic farming?
(A) Enhancing biological cycles within the farming system to maintain soil health
(B) Maximizing immediate crop yields through the heavy, continuous application of synthetic urea
(C) Establishing total reliance on genetically modified seed varieties designed for pest resistance
(D) Applying intensive synthetic chemical herbicides to achieve effective zero-tillage weed control

57. Vermicompost, a key input in organic farming, is prepared using which of the following organisms?
(A) Blue-green algae
(B) Earthworms
(C) Nematodes
(D) Termites

58. Azotobacter is widely used in sustainable agriculture as a:
(A) Synthetic chemical pesticide used for insect control
(B) Free-living nitrogen-fixing biofertilizer
(C) Broad-spectrum synthetic systemic weedicide formulation
(D) Chemically synthesized plant growth hormone stimulant

59. Which Indian state holds the distinction of becoming the first fully organic state in the country?
(A) Sikkim
(B) Kerala
(C) Uttarakhand
(D) Himachal Pradesh

60. Read the following statements of Assertion (A) and Reason (R) carefully and select the correct option:
Assertion (A): Farmers transitioning from conventional chemical farming to organic farming often experience a temporary dip in crop yields during the initial years.
Reason (R): It takes time for the soil's biological activity and fertility to restore naturally after years of chemical usage.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

61. Compared to standard synthetic chemical fertilizers, organic manures generally possess which of the following characteristics?
(A) They possess an exceptionally concentrated and rapidly available balance of essential primary NPK nutrients.
(B) They systematically eliminate and destroy the beneficial natural microflora and microbial population of the soil.
(C) They are completely and inherently devoid of essential trace elements and secondary plant micronutrients.
(D) They release nutrients slowly and improve soil structure over time.

62. What is the largest source of agricultural irrigation in Uttar Pradesh?
(A) Canals
(B) Tanks and Ponds
(C) Tube wells
(D) Traditional open wells

63. In the context of agricultural water management, what does "Water Use Efficiency" (WUE) primarily measure?
(A) The total volumetric rate and quantity of groundwater continuously pumped from an open well in one hour
(B) The ratio of crop yield produced to the amount of water consumed by the crop
(C) The exact physical speed and rate at which surface water evaporates from open canal distribution networks
(D) The overall proportion and regional percentage of cultivated agricultural land covered by flood irrigation

64. The critical stage for the first irrigation in wheat crop, which highly determines the final yield, is known as:
(A) Late booting and soft dough development stage
(B) Mid-season milking and grain development stage
(C) Late hard dough formation and ripening stage
(D) Crown Root Initiation (CRI) stage

65. The Command Area Development (CAD) programme in India was primarily initiated to:
(A) Bridge the gap between irrigation potential created and irrigation potential utilized

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saving farm operating costs.

28. Following the principle of nutrient management in crop rotation, an exhaustive crop like sugarcane or sorghum should be followed by:
(A) Another heavy exhaustive cereal crop such as grain maize or pearl millet
(B) A long-duration commercial plantation crop like tea, coffee, or rubber
(C) A restorative crop like pulse or green manure
(D) Leaving the agricultural land completely and permanently barren without crops

29. Which of the following pairs represents a poor choice for consecutive crops in a scientific crop rotation plan?
(A) Paddy followed by Wheat
(B) Groundnut followed by Wheat
(C) Maize followed by Cowpea
(D) Potato followed by Radish

30. Read the following statements of Assertion (A) and Reason (R) carefully and select the correct option:
Assertion (A): Including leguminous crops in a crop rotation schedule improves the overall health of the soil.
Reason (R): Leguminous plants fix atmospheric nitrogen in the soil through a symbiotic relationship with Rhizobium bacteria.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

31. What is the defining characteristic of a mixed farming system?
(A) Cultivating multiple distinct commercial varieties of high-yielding wheat together in the exact same field
(B) Integrating crop cultivation with livestock rearing on the same farm
(C) Combining and mixing synthetic chemical fertilizers directly with decomposed organic farm manure compost
(D) Producing agricultural crops simultaneously for both local domestic consumption and international export markets

32. Which of the following best defines 'Relay Cropping'?
(A) Planting agricultural crops in narrow parallel strips following the natural elevation contour lines of hilly terrain
(B) Growing completely different cash crops in alternate years on the same field to maintain soil fertility cycles
(C) Cultivating high-value agricultural crops exclusively for commercial certified seed production and distribution
(D) Sowing the seeds of the succeeding crop before the harvesting of the preceding crop

33. What is the primary difference between mixed cropping and intercropping?
(A) Mixed cropping broadcasts mixed seeds without distinct rows, while intercropping uses a definite row pattern.
(B) Mixed cropping mandatory involves rearing farm livestock alongside crops, whereas intercropping excludes animal husbandry completely.
(C) Mixed cropping is practiced exclusively during the Kharif rainy season, while intercropping is restricted to the Rabi winter season.
(D) Mixed cropping relies strictly on high-value commercial cash crops, while intercropping uses food grains and fodder crops exclusively.

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34. Which of the following is the most significant economic benefit of mixed cropping for a marginal farmer?
(A) It guarantees high profit margins by consistently yielding export-quality agricultural produce for global trade.
(B) It ensures the farmer secures a complete commercial monopoly in the local village and regional vegetable markets.
(C) It acts as an insurance against total crop failure due to adverse weather or pests.
(D) It completely eliminates all operational financial costs associated with hiring manual labor for crop harvesting.

35. Multi-tier cropping is most commonly observed in which type of agricultural setup?
(A) Plantation agriculture in tropical regions like Kerala
(B) Arid desert farming systems reliant strictly on seasonal rainfall and deep groundwater extraction
(C) Intensive high-yielding wheat monoculture farming practices in the fertile plains of Punjab
(D) Traditional floating vegetable agriculture

CHAPTER 15

Indian Agricultural System and Crop Cycle

1. What is the most distinguishing characteristic of the Indian agricultural system at the macro level?
(A) High dependence on monsoon rainfall and a large proportion of marginal farmers
(B) Heavy reliance on extensive mechanized farming in all states
(C) Predominance of large corporate landholdings
(D) Complete transition to monoculture commercial cropping

2. Which region of India is generally characterized by plantation agriculture such as tea, coffee, and rubber?
(A) The arid regions of Rajasthan
(B) The Gangetic plains of Uttar Pradesh and Bihar
(C) The Western Ghats and North-Eastern hilly regions
(D) The coastal plains of Gujarat

3. What does the term disguised unemployment refer to in the context of Indian agriculture?
(A) More people engaged in agricultural work than actually required for optimum production
(B) Farmers sitting idle during the dry season
(C) Agricultural labourers moving to urban areas for temporary jobs
(D) Educated youth failing to find jobs in the agricultural sector

4. Which of the following is the defining feature of intensive subsistence farming in India?
(A) Low population pressure on land and high mechanization
(B) Growing single cash crops on large estates solely for export
(C) Clearing a patch of forest, farming it, and then abandoning it
(D) High population pressure on land causing intensive use of biochemical inputs and irrigation

5. Identify the incorrect statement regarding the regional diversity of Indian agriculture.
(A) Wheat and mustard are predominantly grown in the north-western parts of India.
(B) Sugarcane is exclusively grown in the southern states of India due to the tropical climate.
(C) Rice is a staple crop in the eastern and coastal regions of India.
(D) Millets are largely cultivated in the dryland regions of the Deccan Plateau and Rajasthan.

6. Which of the following states is not traditionally considered a major part of the Green Revolution's primary beneficiary region for wheat?
(A) Punjab
(B) Haryana
(C) Odisha
(D) Western Uttar Pradesh

7. What is the primary objective of commercial farming?
(A) Meeting the consumption and subsistence needs of the farmer's household
(B) Preserving indigenous crop seeds and traditional agricultural methods
(C) Providing essential fodder and feed for domestic farm livestock
(D) Producing agricultural crops primarily for sale in commercial markets

8. Which of the following best describes plantation agriculture?
(A) A form of commercial farming where a single crop is grown on a large area
(B) A traditional farming method focused on cultivating multiple crops in a small plot
(C) A farming system that relies solely on natural rainfall without any irrigation
(D) A subsistence farming method practiced by tribal communities

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47. How does the inclusion of tap-rooted crops (like mustard or pigeon pea) in a crop cycle mechanically benefit the soil?
(A) They make the soil highly acidic by releasing massive quantities of organic acids into the root zone.
(B) They break hardpans in the subsoil and improve soil aeration and drainage.
(C) They densely compact the topsoil layer, preventing catastrophic wind erosion completely across the farm.
(D) They rapidly secrete natural chemical compounds that destroy all beneficial earthworms in the upper soil.

48. The practice of leaving crop roots and stubbles in the field to decompose primarily adds which crucial component to the soil?
(A) Silt
(B) Sodium chloride
(C) Sand particles
(D) Humus

49. In managing soil fertility through the crop cycle, maintaining an optimal C:N (Carbon to Nitrogen) ratio is critical. What is the general consequence of incorporating crop residues with a very high C:N ratio (like wheat straw) directly into the soil?
(A) Temporary immobilization of soil nitrogen by microbes
(B) Immediate release of massive amounts of nitrogen to the crops
(C) Complete sterilization of the soil
(D) Instant formation of black cotton soil

50. Consider the following statements regarding pulse crops in the crop cycle:
I. They enhance soil fertility through biological nitrogen fixation.
II. They require significantly more irrigation than rice or sugarcane.
III. They provide protein-rich food and nutritious fodder.
IV. Their deep root systems help in utilizing moisture from deeper soil layers.
Which of the given statements are correct?
(A) I, II and III
(B) I, III and IV
(C) II, III and IV
(D) I, II, III and IV

51. The symbiotic nitrogen fixation in the root nodules of pulse crops is carried out by which group of bacteria?
(A) Rhizobium
(B) Azotobacter
(C) Nitrobacter
(D) Pseudomonas

52. Among the following leguminous crops, which one is known to be a poor nitrogen fixer and responds heavily to nitrogenous fertilizers?
(A) Pigeon pea (Arhar) / Red gram
(B) Chickpea (Gram) / Bengal gram
(C) Mung bean (Moong) / Green gram
(D) French bean (Rajma)

53. Which of the following is the most widely cultivated Kharif pulse crop in Uttar Pradesh, often grown as an intercrop with sorghum or pearl millet?
(A) Chickpea (Gram) / Bengal gram
(B) Pigeon pea (Arhar)
(C) Lentil (Masoor) / Red lentil
(D) Field pea (Matar) / Garden pea

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54. What is the role of leghemoglobin in the root nodules of pulse crops during nitrogen fixation?
(A) It actively transports water and mineral nutrients from the roots to the leaves.
(B) It directly synthesizes essential carbohydrates and sugars during leaf photosynthesis.
(C) It protects the nitrogenase enzyme from oxygen damage.
(D) It acts as a potent toxic defense mechanism against soil-borne plant parasitic nematodes.

55. Match the items in List I with those in List II and select the correct option:
List I: (Leguminous Crop)
P. Soybean
Q. Berseem
R. Chickpea (Gram)
S. Pea
List II: (Specific Rhizobium Species for Seed Treatment)
1. Rhizobium leguminosarum
2. Rhizobium japonicum
3. Rhizobium trifolii
4. Rhizobium ciceri
(A) P-2, Q-3, R-4, S-1
(B) P-1, Q-2, R-3, S-4
(C) P-3, Q-1, R-4, S-2
(D) P-2, Q-4, R-3, S-1

162. (D) Rain washes away soluble soil nutrients
Leaching is a process in deforested tropical soils where high-intensity rainfall percolates downward through exposed topsoil, dissolving and transporting essential soluble mineral nutrients like calcium, magnesium, and potassium into deep subterranean water tables. Devoid of protective tree canopy cover and binding plant root networks, deforested soils suffer rapid nutrient depletion, increased acidity, and severe loss of agricultural productivity.

163. (B) I, III, and IV only
The pyramid of numbers can be inverted in forests where a single large producer tree supports numerous insect herbivores. The energy pyramid is always strictly upright due to progressive heat loss following the ten percent energy transfer rule. However, the pyramid of biomass in terrestrial forest ecosystems is upright—not inverted—because producer tree biomass far exceeds consumer biomass at higher levels.

164. (C) Providing nesting and habitat for wildlife species
Snags, or standing dead trees, provide critical ecological microhabitats within forest ecosystems. Decay opens cavities used by cavity-nesting birds like woodpeckers, owls, bats, and small arboreal mammals for nesting, roosting, and shelter. Furthermore, rotting wood supports specialized wood-boring insects, fungi, and decomposer communities, enriching forest biodiversity and supporting nutrient cycling across multiple trophic levels in forest food webs.

165. (A) Controlling forest growth and composition
Silviculture is the branch of forestry science concerned with controlling the establishment, growth, composition, health, and quality of forest stands to meet diverse landowner and societal needs sustainably. It applies ecological principles through management techniques such as thinning, pruning, controlled burning, clear-felling, and shelterwood regeneration to optimize timber production, enhance watershed protection, and maintain long-term forest health.

166. (D) Lower biodiversity and higher pest vulnerability
Monoculture forest plantations, consisting of single tree species planted uniformly over vast areas, exhibit reduced ecological complexity compared to natural mixed forests. Lacking structural diversity, monocultures offer limited niches, resulting in significantly lower wildlife biodiversity. Furthermore, dense genetic uniformity allows specialized insect pests and fungal pathogens to spread rapidly through stands, dramatically increasing vulnerability to catastrophic pest outbreaks.

167. (B) Having restricted ranges and specific habitats
Endemic species are exceptionally vulnerable to extinction from deforestation because their natural geographical ranges are strictly confined to specific localized habitats or microclimates. Lacking broad geographical distribution, any habitat destruction, canopy fragmentation, or microclimatic shift within their limited domain can eliminate their entire global population, preventing escape or natural recolonization from neighboring intact forest landscapes.

168. (C) Absorbing harmful UV radiation to protect plant cells
The stratospheric ozone layer serves a vital protective function for terrestrial forest ecosystems by filtering and absorbing high-energy solar ultraviolet-B radiation. Shielding the Earth surface from excessive UV exposure prevents physiological damage to foliage plant tissue, protects photosynthetic pigments from breakdown, avoids DNA mutations in plant cells, and maintains primary biological productivity and healthy growth dynamics across forest biomes.

169. (D) Tonnes of Carbon per hectare
The standard scientific unit for quantifying carbon sequestered and stored within a forest ecosystem is Tonnes of Carbon per hectare. This metric measures organic carbon density retained across aboveground tree biomass, subterranean root systems, standing leaf litter, and deep soil organic matter. Standardizing carbon inventory measurements using this metric allows global comparison of forest carbon sinks and climate mitigation capacities.

170. (A) Periodic surface fires
Certain coniferous species, particularly specific pine trees, possess serotinous cones sealed with sticky resin. These cones remain tightly closed for years, retaining viable seeds within the canopy. Periodic low-intensity surface fires generate the thermal heat necessary to melt resin seals, opening cones to release seeds onto ash-enriched,

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(B) Construct massive multi-purpose concrete dams and hydroelectric power generation reservoirs across major river basins
(C) Promote traditional rainfed dryland farming techniques and indigenous soil conservation methods exclusively
(D) Divert public agricultural water resources strictly for heavy urban industrial usage and commercial manufacturing

66. Under protective irrigation, the primary goal of water application is to:
(A) Provide continuous standing water and flooded conditions throughout the crop lifecycle
(B) Maximize luxury water consumption and transpiration rates within mature farm plants
(C) Protect the crop from severe moisture stress during dry spells
(D) Wash away excess accumulated surface salts from the topsoil down into lower subsoil layers

67. The Taungya system, a traditional form of agro-forestry, involves:
(A) Raising agricultural crops along with forest plantation during the early years of tree establishment
(B) Cultivating edible aquatic plants and raising fish within natural perennial forest streams and rivers
(C) Harvesting non-timber forest produce and medicinal herbs without cutting down mature standing timber trees
(D) Completely clearing natural primary forest land to practice intensive commercial dairy and livestock farming

68. A Silvipastoral system in agro-forestry specifically integrates:
(A) Woody perennial trees, seasonal agricultural grain crops, and managed honey bees
(B) Wild medicinal plant species combined exclusively with commercial timber trees
(C) Multi-story fruit orchards combined with intensive seasonal vegetable cultivation
(D) Trees, pasture/forage crops, and livestock

69. Which term describes the coordination of agricultural crop production with the cultivation of woody perennials/trees on the same unit of land?
(A) Freshwater aquaculture
(B) Agrisilviculture
(C) Commercial apiculture
(D) Mulberry sericulture

70. Which of the following is a major ecological benefit of adopting agro-forestry in traditional cropping systems?
(A) It drastically accelerates wind and water soil erosion across topsoil layers.
(B) It creates a simplified, highly vulnerable monoculture agricultural environment.
(C) It acts as a carbon sink and helps in microclimate moderation.
(D) It completely stops the natural percolation and infiltration of rainwater into the ground.

71. In Western Uttar Pradesh and Punjab, which fast-growing tree species is widely integrated with wheat and sugarcane in commercial agro-forestry models?
(A) Teak
(B) Sal
(C) Sandalwood
(D) Poplar

72. In agro-forestry, the phenomenon where certain trees release biochemicals that inhibit the growth of surrounding agricultural crops is known as:
(A) Allelopathy
(B) Symbiosis
(C) Phototropism
(D) Eutrophication

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73. Who among the following is widely recognized as the Father of the Green Revolution in India?
(A) Dr. Varghese Kurien
(B) M.S. Swaminathan
(C) Dr. Norman Borlaug
(D) Shri C. Subramaniam

74. The high-yielding varieties (HYV) of wheat seeds that sparked the Green Revolution in India were originally developed in and imported from:
(A) United Kingdom
(B) Mexico
(C) Japan
(D) Australia

75. Select the correct chronological order of the following agricultural and allied developments in India:
I. Launch of the Green Revolution
II. Launch of Operation Flood (White Revolution)
III. Establishment of the National Bank

(A) Planting dense border rows of winter wheat around a flooded Kharif paddy field
(B) Cultivating rows of tall evergreen shade trees around a commercial tropical tea estate
(C) Planting a few rows of okra (Bhindi) around a cotton field to attract bollworms
(D) Broadcasting and mixing rice and wheat seed grains together in the exact same field row

93. To naturally suppress soil-borne plant parasitic nematodes in the crop cycle, farmers are often advised to include which type of suppressive crops?
(A) Commercial sugarcane varieties
(B) Tropical banana plantations
(C) Solanaceous crops like brinjal
(D) Marigold or Mustard

94. Cultural control of agricultural pests refers to:
(A) Performing traditional religious rituals and worshipping local agricultural deities to spiritually protect standing farm crops
(B) Spraying purely synthetic chemical pesticides that have been specifically imported from foreign industrial cultures
(C) Manipulation of farming practices like tillage, time of sowing, and crop rotation to reduce pest damage
(D) Artificially rearing, mass-producing, and continuously releasing beneficial insect predators directly into the field

95. Deep summer ploughing of agricultural fields in North India is primarily done to:
(A) Intentionally increase and multiply the dormant weed seed bank present within the upper soil profile
(B) Expose soil-borne pests, pupae, and weed rhizomes to scorching solar heat and natural predators
(C) Maximumly conserve pre-existing soil moisture reservoirs deep underground prior to the onset of monsoons
(D) Instantly and mechanically convert raw biological subsoil into fertile organic topsoil in a single pass

96. In which year was the flagship "Soil Health Card Scheme" launched by the Government of India to assess and manage soil health?
(A) 2010
(B) 2015
(C) 2018
(D) 2020

97. A standard Soil Health Card provides the status of the soil with respect to how many parameters (including macro, secondary, micro-nutrients, and physical parameters)?
(A) 6
(B) 9
(C) 12
(D) 16

98. Which of the following crops is most commonly grown and incorporated into the soil specifically as a "Green Manure" in Uttar Pradesh?
(A) Commercial Sorghum (Fodder)
(B) Solanaceous Potato crops
(C) Dhaincha (Sesbania)
(D) Hybrid Oilseed Sunflower

99. At what growth stage is a green manure crop generally ploughed back into the soil for maximum decomposition and nutrient benefit?
(A) Pre-flowering to early flowering stage
(B) Early tender seedling emergence growth stage
(C) Complete crop maturity and final seed setting stage
(D) Final post-harvest stage after complete plant senescence

100. Read the following statements of Assertion (A) and Reason (R) carefully and select the correct option:
Assertion (A): Soil Organic Carbon (SOC) is considered the most critical indicator of overall soil health and fertility.
Reason (R): SOC improves soil structure, water holding capacity, and serves as a primary energy source for soil microorganisms.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

101. What is the fundamental concept behind an Integrated Farming System (IFS)?
(A) Directing an exclusive, specialized farm focus towards continuously producing a single export-quality cash crop
(B) Interdependent integration of various agricultural enterprises where the waste of one becomes the input for another

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flowering and subsequent ripening process of the crop
(D) Early forced maturity leading to shriveled grains and reduced yield

85. Match the items in List I with those in List II and select the correct option:
List I: (Greenhouse Gas Emitted from Agriculture)
P. Methane (CH_4)
Q. Nitrous Oxide (N_2O)
R. Carbon Dioxide (CO_2)
S. Ammonia (NH3) volatilization
List II: (Primary Agricultural Source)
1. Flooded paddy fields and enteric fermentation in livestock
2. Application of synthetic nitrogenous fertilizers
3. Burning of crop residues and fossil fuel use in farm machinery
4. Surface application of urea in basic soils
(A) P-1, Q-2, R-3, S-4
(B) P-2, Q-1, R-3, S-4
(C) P-1, Q-3, R-2, S-4
(D) P-3, Q-2, R-1, S-4

86. How might climate change impact the traditional cropping zones in India?
(A) Commercial crop cultivation will become strictly restricted to narrow equatorial tropical regions across the globe.
(B) Virtually all seasonal annual agricultural crops will naturally evolve to become climate-resilient perennial species.
(C) There will be a noticeable shift of crop cultivation zones towards higher latitudes and altitudes.
(D) Low-lying coastal plain areas will suddenly transform into the only viable geographic zones for global agriculture.

87. What is the core objective of 'Climate-Smart Agriculture' (CSA)?
(A) To deliberately increase farm greenhouse gas emissions in order to promote maximum atmospheric carbon fertilization
(B) To transition all crop production exclusively inside heavily insulated, fully climate-controlled glasshouses
(C) To completely abandon traditional field-based agriculture in favor of fully automated synthetic food production facilities
(D) To sustainably increase agricultural productivity, build resilience to climate change, and reduce emissions

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88. The phenomenon where elevated atmospheric CO_2 levels potentially enhance the rate of photosynthesis and crop yield in certain plants (like wheat and rice) is known as:
(A) Carbon fertilization effect
(B) Geological carbon sequestration
(C) Agricultural carbon footprinting
(D) Ecological biomagnification

89. Unseasonal heavy rainfall and hailstorms during the months of March and April primarily threaten the harvesting of which group of crops in Uttar Pradesh?
(A) Kharif crops
(B) Rabi crops
(C) Zaid crops
(D) Plantation crops

90. Consider the following statements about Trap Cropping:
I. Trap crops are planted to attract insects or other pests away from the main cash crop.
II. Once pests accumulate on the trap crop, it is often treated with pesticides or destroyed.
III. Marigold is often used as a trap crop in tomato fields to manage nematodes and fruit borers.
IV. Trap crops are always harvested and sold at a higher price than the main crop.
Which of the given statements are correct?
(A) I, II and IV
(B) I, II and III
(C) II, III and IV
(D) I, III and IV

91. Breaking the pest life cycle through crop rotation relies on which fundamental ecological principle?
(A) Pests usually have specific host-plant preferences, and removing the host starves the pest population.
(B) Most destructive agricultural pests are extraordinarily adaptable and can effortlessly feed on any crop family.
(C) Insect pests automatically migrate long distances to urban areas whenever their preferred crop is harvested.
(D) Rotating crops directly alters and mutates the internal cellular genetic structure of field pests over time.

92. Which of the following is a classic example of using a trap crop in pest management?

(A) USA
(B) Japan
(C) Israel
(D) Australia

127. Which of the following irrigation methods boasts the highest water use efficiency, often reaching 90-95%?
(A) Basin irrigation
(B) Drip irrigation
(C) Furrow irrigation
(D) Sprinkler irrigation

128. What is the process of applying dissolved soluble fertilizers directly to the plant root zone along with irrigation water called?
(A) Chemigation
(B) Fumigation
(C) Broadcasting
(D) Fertigation

129. Sprinkler irrigation is highly suitable and recommended for which type of topography and soil?
(A) Undulating or rolling terrain with sandy soils
(B) Perfectly flat, heavily compacted impervious clay soils
(C) Permanently waterlogged low-lying coastal river basin areas
(D) Deep expansive black cotton clay soils prone to heavy cracking

130. Consider the following statements regarding the "Per Drop More Crop" component of PMKSY:
I. It focuses on enhancing water use efficiency at farm level through Micro Irrigation.
II. It promotes technologies like drip and sprinkler irrigation.
III. It completely bans the use of canal irrigation in the country.
IV. It encourages capacity building and extension activities related to micro-irrigation.
Which of the given statements are correct?
(A) I, II and III
(B) II, III and IV
(C) I, II and IV
(D) I, III and IV

131. To facilitate states in mobilizing resources for expanding micro-irrigation, a dedicated Micro Irrigation Fund (MIF) was established under which institution?
(A) NABARD
(B) Reserve Bank of India (RBI)
(C) State Bank of India (SBI)
(D) NITI Aayog

132. The burning of paddy crop residue (stubble burning) in North-Western India primarily leads to a severe spike in which atmospheric pollutants during winter?
(A) Atmospheric Ozone gas, Nitrous Oxide, and industrial Chlorofluorocarbons
(B) Heavy toxic metal Lead particles, Arsenic dust, and airborne Mercury vapor
(C) Radioactive Radon gas isotopes and inert noble atmospheric elements
(D) Particulate Matter (PM 2.5 and PM 10) and Black Carbon

133. The 'Happy Seeder' is an agricultural machine heavily promoted to manage crop residue. What is its primary function?
(A) It mechanically collects standing stubble and burns the crop residue inside a closed mobile furnace chamber.
(B) It cuts standing stubble, sows wheat seeds, and deposits straw as mulch in a single pass.
(C) It digs deep subterranean trenches across the farm field to bury the harvested stubble completely under subsoil.
(D) It compresses harvested field stubble into dense bio-coal blocks for immediate industrial fuel distribution.

134. Which essential soil nutrient is almost entirely lost to the atmosphere during the burning of crop residues?
(A) Phosphorus
(B) Potassium
(C) Nitrogen
(D) Calcium

135. The 'Pusa Decomposer', developed by IARI to curb stubble burning, is essentially a consortium of:
(A) Laboratory-prepared chemically synthesized organic acids and mineral solutions
(B) Hybrid strains of genetically modified earthworms tailored for fast straw digestion
(C) Specialized herbivorous insect species that rapidly consume dry post-harvest field straw
(D) Seven strains of fungi that accelerate the decomposition of paddy straw

136. Ex-situ management of crop residue involves:
(A) Removing the residue from the field and

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(C) Aggregating and merging small contiguous private landholdings into one massive centralized corporate farm entity
(D) Deploying highly automated robotic field machinery and artificial intelligence systems for all farm operations

102. Which of the following is typically NOT considered an integrated component within a standard Integrated Farming System (IFS) model?
(A) Freshwater aquaculture and fish farming systems
(B) Commercial livestock and dairy cattle farming
(C) Heavy industrial manufacturing
(D) Honey bee keeping and apiculture management

103. The duck-rice farming system is an excellent example of IFS. How do ducks benefit the paddy crop?
(A) By actively transferring pollen and pollinating the delicate rice flowers during blooming season
(B) By acting as aggressive guard animals that protect the open field from intruding stray cattle
(C) By mechanically cutting and harvesting the delicate mature rice grains during the harvest phase
(D) By feeding on weeds and harmful insects, while their droppings act as fertilizer

104. Why is the Integrated Farming System (IFS) highly recommended for marginal and small farmers in India?
(A) It assures a regular, year-round flow of income and reduces risk compared to mono-cropping.
(B) It demands immense upfront capital infrastructure investment which small marginal farmers can easily borrow from banks.
(C) It completely eliminates the fundamental operational need for hiring or utilizing manual farm labor entirely.
(D) It strictly restricts and legally prohibits farmers from selling any harvested farm produce in open local markets.

105. In an integrated crop-livestock farming system, what is the most common synergistic exchange?
(A) Livestock continuously release metabolic oxygen gas directly into the local microclimate to nourish crops.
(B) Crop residues are used as livestock feed, and livestock manure is used to fertilize the crops.
(C) Farm livestock are trained and deployed solely to act as perimeter guard animals protecting field crops.
(D) Standing field crops physically grow dense protective overhead canopies to shelter livestock during severe floods.

106. Who is widely acknowledged as the pioneer of the "Zero Budget Natural Farming" (ZBNF) movement in India?
(A) M.S. Swaminathan
(B) Subhash Palekar
(C) Vandana Shiva
(D) Rajendra Singh

107. Which of the following is NOT one of the four main pillars of Zero Budget Natural Farming (ZBNF)?
(A) Genetically Modified Seeds
(B) Fermented microbial Jivamrita solution
(C) Indigenous seed-treatment Bijamrita preparation
(D) Acchadana (Soil and crop residue mulching)

108. In Zero Budget Natural Farming, what are the primary ingredients used to prepare 'Jivamrita', a microbial culture?
(A) Concentrated synthetic urea, diammonium phosphate (DAP), and muriate of potash
(B) Laboratory-synthesized chemical growth hormones, systemic fungicides, and antibiotics
(C) Cow dung, cow urine, jaggery, pulse flour, and undisturbed soil
(D) Commercial liquid seaweed extract concentrate combined with imported exotic earthworm species

109. The term 'Whapasa' in Zero Budget Natural Farming refers to:
(A) The systematic broadcast application of selective post-emergence synthetic chemical weedicides across field crops
(B) The seasonal practice of intentionally burning post-harvest crop residue in open fields to clear sowing land
(C) A heavy wooden traditional animal-drawn plow mechanism pulled by indigenous pair of draft bullocks

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(D) The condition where both air and water molecules are present in the soil, ensuring root aeration

110. How does Zero Budget Natural Farming (ZBNF) theoretically differentiate itself from standard organic farming?
(A) ZBNF promotes the widespread commercial purchase of off-farm biological inputs and vermicompost, whereas organic farming strictly prohibits buying external inputs.
(B) ZBNF explicitly advocates using laboratory-developed genetically modified seed hybrids, whereas certified organic farming relies strictly on heritage heirloom seeds.
(C) ZBNF eliminates purchased inputs using local resources like native cows, while organic farming allows costly certified inputs.
(D) ZBNF mandates the installation of extensive high-cost micro-irrigation network infrastructure, whereas organic farming relies strictly on natural monsoons.

111. Under the Pradhan Mantri Fasal Bima Yojana (PMFBY), what is the maximum premium rate payable by farmers for all Kharif food and oilseed crops?
(A) 1.5% of the sum insured
(B) 2.0% of the sum insured
(C) 5.0% of the sum insured
(D) 10.0% of the sum insured

112. Under the PMFBY, what is the maximum premium rate payable by farmers for all Rabi food and oilseed crops?
(A) 1.0%
(B) 1.5%
(C) 2.0%
(D) 5.0%

113. Under the PMFBY, what is the standard premium rate payable by farmers for annual commercial and horticultural crops?
(A) 2%
(B) 3%
(C) 5%
(D) 8%

114. Which of the following risks is NOT typically covered under the Pradhan Mantri Fasal Bima Yojana (PMFBY)?
(A) Prevented sowing or planting risk due to deficit rainfall
(B) Loss due to wild animal attacks where local specific notifications are absent
(C) Malicious damage, theft, or nuclear risks
(D) Losses due to non-preventable risks like drought, flood, and pests during the standing crop

115. Match the items in List I with those in List II and select the correct option:
List I: (Agricultural Scheme/Programme)
P. PMFBY
Q. PMKSY
R. Soil Health Card Scheme
S. e-NAM
List II: (Core Objective)
1. National electronic agriculture trading portal
2. Crop insurance against natural risks
3. Rationalized application of fertilizers based on soil testing
4. Enhancing water use efficiency and expanding irrigation
(A) P-2, Q-4, R-3, S-1
(B) P-1, Q-2, R-4, S-3
(C) P-4, Q-3, R-2, S-1
(D) P-2, Q-1, R-3, S-4

116. In the context of factors affecting agricultural productivity, 'Edaphic factors' specifically refer to:
(A) Macro-climatic weather conditions including seasonal temperature patterns and annual rainfall
(B) Geographic topographical features including land surface slope gradients and terrain elevation altitude
(C) Interacting biological ecosystem agents including field insect pests, pollinators, and soil earthworms
(D) Soil conditions including structure, pH, and nutrient content

117. How does the topographic factor of steep slope adversely affect agricultural productivity?
(A) It drastically increases water retention capacity in the root zone, creating severe perennial waterlogging.
(B) It accelerates soil erosion and makes mechanized farming difficult.
(C) It severely reduces atmospheric solar radiation and the overall availability of sunlight to growing field crops.
(D) It completely halts and stops the localized atmospheric occurrence of seasonal monsoonal rainfall events.

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118. Which of the following represents a major socio-economic constraint limiting agricultural productivity in India?
(A) High incidence of solar radiation
(B) Abundance of major perennial rivers
(C) Fragmentation and small size of landholdings
(D) Over-availability of highly skilled agricultural labour

119. In Indian agriculture, a farmer holding less than 1 hectare of agricultural land is classified as a:
(A) Small farmer
(B) Semi-medium farmer
(C) Large farmer
(D) Marginal farmer

120. Consider the following statements regarding the determinants of agricultural productivity:
I. Timely availability of institutional credit enhances input usage and productivity.
II. Inadequate rural road infrastructure leads to high post-harvest losses, effectively reducing net productivity.
III. Excessive and unbalanced use of nitrogenous fertilizers permanently increases productivity.
Which of the given statements are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II and III

121. In land-use classification, what distinguishes "Current Fallow" from "Other Fallow (Old Fallow)" land?
(A) Current fallow is left uncultivated for 1 to 5 years, whereas old fallow refers strictly to lands uncultivated for less than 1 single agricultural year.
(B) Current fallow is uncultivated for up to 1 agricultural year, while old fallow is left uncultivated for 1 to 5 years.
(C) Current fallow defines permanently arid barren desert land, whereas old fallow defines fertile alluvial soil situated alongside natural riverbanks.
(D) Current fallow designates land converted for industrial factories, whereas old fallow designates land designated for protected natural forests.

122. Historically, what was the primary agronomic reason for farmers leaving a piece of land as fallow for a season?
(A) To illegally evade government agricultural land property tax payments assessed on active farming plots
(B) To allow the soil to naturally rest, recuperate its fertility, and accumulate moisture
(C) To systematically clear and prepare the farm land for immediate industrial and commercial urban construction purposes
(D) To permanently convert agricultural land parcels into officially protected government wildlife conservation sanctuaries

123. With increasing population pressure on land, continuous fallowing is becoming economically unviable. Which of the following is the most scientifically recommended alternative to fallowing for restoring soil health?
(A) Inclusion of short-duration leguminous crops or green manure in the crop cycle
(B) Practicing continuous intensive cultivation of heavy nutrient-exhausting cash crops such as sugarcane on a year-round basis
(C) Paving arable agricultural topsoil with industrial concrete slabs to physically prevent weed growth between cropping seasons
(D) Applying highly concentrated chemical acid treatments directly onto topsoil to chemically sterilize weed seed banks permanently

124. Land which is left uncultivated for more than five consecutive agricultural years is categorized in Indian land-use statistics as:
(A) Total Net Sown Area
(B) Current Fallow Land
(C) Culturable waste
(D) Protected Forest Land

125. Arrange the following land-use categories in decreasing order of their typical area proportion in India:
I. Net Sown Area
II. Forest Cover
III. Barren and Unculturable Land
IV. Pastures and Grazing Lands
Select the correct order from the options given below:
(A) I, II, III, IV
(B) I, III, II, IV
(C) II, I, IV, III
(D) II, I, III, IV

126. The modern technology of drip irrigation was fundamentally developed and popularized globally by which country?

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for Agriculture and Rural Development (NABARD)
IV. Introduction of the Pradhan Mantri Fasal Bima Yojana (PMFBY)
(A) I → II → III → IV
(B) II → I → III → IV
(C) I → III → II → IV
(D) III → I → II → IV

76. Which of the following has emerged as a significant negative long-term ecological impact of the Green Revolution in North-Western India?
(A) Massive expansion of desertification due to lack of irrigation
(B) Total extinction of indigenous cattle breeds
(C) Severe depletion of groundwater tables and soil salinization
(D) Rapid increase in forest cover at the expense of agricultural land

77. Which combination of inputs was central to the success of the Green Revolution technology package?
(A) Traditional indigenous seeds, heavy organic compost manure, and purely rainfed farming
(B) Genetically modified hybrid seed varieties combined with complete zero-tillage farming
(C) Dryland soil conservation farming techniques integrated with bio-pesticides and neem cake
(D) HYV seeds, chemical fertilizers, pesticides, and assured irrigation

78. Which crop experienced the most spectacular increase in production and productivity during the first phase of the Green Revolution in India?
(A) Pulses
(B) Oilseeds
(C) Wheat
(D) Cotton

79. Crop diversification essentially implies:
(A) Shifting the entire agricultural workforce to the industrial sector
(B) Moving away from mono-cropping to growing a variety of crops
(C) Standardizing a single crop variety for the entire country
(D) Converting all agricultural land into permanent pastures

80. Consider the following statements regarding the need for crop diversification in India:
I. It mitigates the economic risk for farmers against price fluctuations.
II. It is essential for restoring soil health degraded by the continuous rice-wheat cycle.
III. It completely removes the need for Minimum Support Price (MSP).
Which of the given statements is/are incorrect?
(A) I and II only
(B) II and III only
(C) III only
(D) I only

81. In states like Punjab and Haryana, agricultural experts are heavily advocating shifting a portion of acreage away from water-guzzling paddy towards which group of crops?
(A) Millets, Pulses, and Oilseeds
(B) Commercial sugarcane and tropical banana plantations
(C) Plantation crops like natural rubber and coffee beans
(D) Fiber and beverage crops such as raw jute and green tea

82. How does crop diversification aid in natural pest management?
(A) It encourages a single specific type of pest to multiply rapidly across fields, making them very easy to target.
(B) It chemically alters the crop foliage to make all plants extraordinarily toxic to both chewing and sucking insects.
(C) It disrupts the availability of host plants, breaking the life cycle of specialized pests.
(D) It mandates the continuous, intensive aerial spraying of synthetic chemical pesticides throughout the crop season.

83. Under the Rashtriya Krishi Vikas Yojana (RKVY), the Crop Diversification Programme (CDP) was initially targeted at replacing which crop in the Original Green Revolution states?
(A) Paddy
(B) Tobacco
(C) Sugarcane
(D) Cotton

84. What is the predicted primary impact of rising terminal heat (sudden high temperatures during March-April) due to climate change on the wheat crop in North India?
(A) A highly significant increase in overall grain size, weight, and harvest yield
(B) The total structural breakdown and complete destruction of the subterranean root system
(C) A major unexpected delay in the natural

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using it for biomass power generation, bio-ethanol, or cardboard manufacturing
(B) Mechanically chopping the standing post-harvest residue and incorporating it directly into the field soil profile
(C) Evenly spreading and using the unchopped raw crop residue as a protective organic mulch cover across the field
(D) Setting fire to and burning the dry crop residue exactly where the crop was originally harvested in the field

137. Which of the following missions under the National Action Plan on Climate Change (NAPCC) focuses directly on adapting Indian agriculture to climate variability?
(A) National Solar Mission (NSM)
(B) NMSA
(C) National Water Mission (NWM)
(D) National Mission for Green India (GIM)

138. The Paramparagat Krishi Vikas Yojana (PKVY) was launched by the Government of India primarily to promote:
(A) High-yielding Genetically Modified (GM) commercial food crops
(B) Cluster-based organic farming with PGS certification
(C) High-input chemical-intensive export-oriented monoculture farming
(D) Large-scale corporate contract farming and land leasing models

139. The comprehensive strategy for "Doubling Farmers' Income" in India was formulated based on the recommendations of an inter-ministerial committee headed by:
(A) Ashok Dalwai
(B) M.S. Swaminathan
(C) Ramesh Chand
(D) Shanta Kumar

140. Read the following statements of Assertion (A) and Reason (R) carefully and select the correct option:
Assertion (A): The open-ended procurement policy and guaranteed Minimum Support Price (MSP) for rice and wheat have distorted the crop cycle in states like Punjab and Haryana.
Reason (R): Assured procurement incentivizes farmers to continuously grow paddy and wheat, discouraging the cultivation of ecologically suitable pulses and oilseeds.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

141. The concept of the "Evergreen Revolution" in Indian agriculture, which emphasizes enhancing productivity without ecological harm, was popularized by:
(A) Dr. Verghese Kurien
(B) Dr. Norman Borlaug
(C) Dr. Vandana Shiva
(D) M.S. Swaminathan

142. What is the central aim of the Uttar Pradesh Agriculture Export Policy 2019?
(A) To strictly ban and legally prohibit the export of all primary agricultural commodities from the state
(B) To import higher quantities of subsidized foreign food grains directly into the state distribution system
(C) To double agricultural exports from the state and increase farmers' income
(D) To mandate and force domestic farmers to cultivate non-food commercial crops exclusively across all districts

143. Which cash crop is colloquially referred to as the "economic lifeline" for millions of farmers in Western and Central Uttar Pradesh?
(A) Commercial Tobacco
(B) Sugarcane
(C) Medicinal Opium
(D) Raw Fiber Jute

144. Under the One District One Product (ODOP) scheme of Uttar Pradesh, the 'Kala Namak Rice' is famously associated with which district?
(A) Mathura district
(B) Varanasi district
(C) Meerut district
(D) Siddharthnagar

145. Match the items in List I with those in List II and select the correct option:
List I: (District of Uttar Pradesh)
P. Pratapgarh
Q. Muzaffarnagar
R. Kaushambi
S. Gonda
List II: (Agricultural/Horticultural Product under ODOP)

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1. Jaggery (Gud)
2. Amla (Indian Gooseberry)
3. Banana
4. Pulses (Dal)

(A) P-2, Q-1, R-3, S-4
(B) P-1, Q-2, R-4, S-3
(C) P-2, Q-3, R-1, S-4
(D) P-3, Q-1, R-2, S-4

146. To address the issue of labour shortage and improve efficiency, the Uttar Pradesh government provides subsidies for setting up Custom Hiring Centres (CHCs) primarily under which scheme?
(A) Pradhan Mantri Kisan Samman Nidhi Direct Income Support Scheme
(B) Centrally Sponsored National Food Security Mission Infrastructure Scheme
(C) Sub-Mission on Agricultural Mechanization (SMAM)
(D) Comprehensive Pradhan Mantri Fasal Bima Insurance Scheme

147. What is the core objective of the 'Mukhya Mantri Krishak Durghatna Kalyan Yojana' in Uttar Pradesh?
(A) To provide financial assistance to farmers or their families in case of death or disability during agricultural work
(B) To distribute and provide fully subsidized free tractor machinery to all registered farming households across the state
(C) To completely waive off and write clear all outstanding institutional agricultural loans owed by small landholders
(D) To supply completely free, uninterrupted electrical power supply for operating all private groundwater tube wells

148. According to recent agricultural data, what is the approximate position of Uttar Pradesh in total food grain production in India?
(A) First
(B) Third
(C) Fifth
(D) Seventh

149. To adapt to unpredictable monsoons and climate change, agricultural scientists have developed drought-tolerant rice varieties. Which of the following is a prominent drought-tolerant rice variety?
(A) Swarna Sub1
(B) Sahbhagi Dhan
(C) Pusa Basmati 1121
(D) IR 8

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150. Consider the following statements regarding 'Biofortification':
I. It is the process of breeding crops with higher levels of vitamins, minerals, or proteins.
II. It is aimed at reducing hidden hunger (micronutrient deficiency) in the population.
III. It can only be achieved by adding chemicals to the harvested grain.
Which of the given statements is/are correct?
(A) I and II only
(B) II and III only
(C) I and III only
(D) I, II and III

151. CR Dhan 310 is a notable newly developed rice variety known for its high content of:
(A) Vitamin C
(B) Calcium
(C) Omega-3 fatty acids
(D) Protein

152. 'Golden Rice' is a genetically engineered crop variety developed to synthesize beta-carotene, a precursor of:
(A) Vitamin A
(B) Vitamin B12
(C) Vitamin C
(D) Vitamin D

153. To combat flash floods, scientists have incorporated which specific gene into popular rice varieties to make them submergence-tolerant?
(A) Cry1Ac
(B) Sub1A
(C) EPSPS
(D) Nif gene

154. What is the primary trait of the newly developed wheat variety HD 3385?
(A) High genetic resistance to prolonged seasonal field waterlogging
(B) Heat tolerance to withstand early onset of summer temperatures
(C) Extreme high physiological susceptibility to yellow rust fungal disease
(D) Exceptional biological ability to grow and produce yield in pure sand

155. Which of the following represents the correct general sequence of the phonological growth stages in a cereal crop like wheat?
(A) Tillering → Germination → Booting → Anthesis (Flowering) → Dough stage

(B) Germination → Tillering → Booting → Anthesis (Flowering) → Dough stage
(C) Germination → Booting → Tillering → Dough stage → Anthesis (Flowering)
(D) Tillering → Booting → Germination → Dough stage → Anthesis (Flowering)

156. The United Nations declared the year 2023 as the International Year of:
(A) Grain Pulses
(B) Organic Quinoa
(C) Millets
(D) Healthy Soils

157. A 'Catch Crop' in the crop cycle is defined as a:
(A) A specialized border crop grown exclusively to physically trap and divert harmful insect pests away from main fields
(B) A deep-rooted perennial crop grown specifically to mine and bring up lost mineral nutrients from subsoil layers
(C) An orchard crop that continuously yields high commercial harvests year after year for multiple decades
(D) Fast-growing crop grown between two main crops when the regular crop fails or sowing is delayed

158. Ley farming, an important practice in sustainable agriculture, refers to:
(A) Simulating forest environments by continuously growing annual arable crops and timber trees together on the same land
(B) Cultivating high-value salt-tolerant food crops along saline coastal backwaters and estuarine wetland systems
(C) Alternating arable crops with temporary sown pastures for resting the land and providing fodder
(D) Cultivating sensitive high-value commercial horticultural crops entirely inside a climate-controlled glass greenhouse

159. The 'Critical Period of Crop-Weed Competition', during which weed removal is essential to prevent significant yield loss, generally falls:
(A) During the late reproductive phase just before final harvest
(B) In the first one-third of the crop's growing period
(C) Immediately after the crop has flowered and set seed heads
(D) During the final stage after the crop has naturally senesced

160. Consider the following statements about the Zaid agricultural season:
I. It is a short season between Rabi and Kharif.
II. It generally requires assured irrigation facilities.
III. Watermelon, muskmelon, and vegetables are majorly grown during this season.
IV. It is the longest agricultural season in India.
Which of the given statements are correct?
(A) I, II and IV
(B) I, II and III
(C) II, III and IV
(D) I, III and IV

161. From a physiological and agricultural perspective, C4 plants like maize and sorghum are generally considered to have:
(A) Higher water use efficiency and heat tolerance than C3 plants
(B) Significantly lower seasonal water use efficiency than temperate C3 plants such as wheat and barley
(C) Complete zero physiological ability to perform photosynthesis under bright direct solar light intensity
(D) Absolute physiological intolerance and extreme high sensitivity to natural ambient drought conditions

162. Zero Tillage (No-Till) farming is gaining popularity in the Indo-Gangetic plains because it:
(A) Requires intensive, heavy deep-bed tractor ploughing directly into compact subsoil profiles
(B) Completely eradicates and permanently eliminates any practical need for future field weed management
(C) Saves time, fuel, and reduces soil erosion while conserving moisture
(D) Mandates setting fire to and burning all loose surface crop residues prior to seed sowing

163. The cultural practice of 'Blind Hoeing' is specifically associated with the early growth stage of which crop?
(A) Sugarcane
(B) Bread Wheat
(C) Kharif Paddy
(D) Indian Mustard

164. According to modern plant nutrition principles, how many elements are universally recognized as essential plant nutrients?

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48. (D) Humus
Leaving crop roots and field stubble to decompose naturally in agricultural soil supplies abundant organic matter. Soil microflora break down these plant residues into stable organic matter known as humus. Humus improves soil crumb structure, increases cation exchange capacity, enhances water retention, and serves as a long-term nutrient reservoir for crop growth.

49. (A) Temporary immobilization of soil nitrogen by microbes
When crop residues with high carbon-to-nitrogen ratios, such as wheat straw, are incorporated into the soil, soil microbes rapidly consume available mineral nitrogen to digest the carbon. This process temporarily locks up inorganic soil nitrogen into microbial biomass, causing nitrogen immobilization that can temporarily starve growing cash crops unless supplementary nitrogen is supplied.

50. (B) I, III and IV
Pulses improve soil fertility through biological nitrogen fixation, supply protein-rich food and nutritious crop residues for fodder, and utilize subsoil moisture via deep root systems. Statement II is incorrect because pulses are drought-tolerant crops requiring substantially less irrigation than water-intensive crops like rice or sugarcane.

51. (A) Rhizobium
Symbiotic nitrogen fixation in the root nodules of pulse crops is performed by soil bacteria belonging to the genus Rhizobium. These bacteria colonize host plant roots, forming root nodules where they convert atmospheric dinitrogen gas into plant-absorbable ammonium forms, while receiving carbohydrates synthesized by the legume host plant in return.

52. (D) French bean (Rajma)
French bean (Rajma) is an exception among leguminous pulse crops because it lacks effective symbiotic association with natural nitrogen-fixing Rhizobium strains. As a poor biological nitrogen fixer, it cannot supply its own nitrogen needs from the atmosphere and relies heavily on external basal and top-dressed nitrogenous fertilizer applications to achieve potential yield.

53. (B) Pigeon pea (Arhar)
Pigeon pea (Arhar) is the dominant Kharif pulse crop cultivated across Uttar Pradesh. Due to its long growth duration and deep root system, it is frequently intercropped with short-duration cereals like sorghum or pearl millet, maximizing land use efficiency, providing nitrogen benefits, and offering economic risk protection to rainfed agricultural farmers.

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54. (C) It protects the nitrogenase enzyme from oxygen damage.
Leghemoglobin is a red iron-containing protein found in the root nodules of nitrogen-fixing legumes. Its primary function is to bind free oxygen, maintaining a strictly low oxygen tension inside the nodule. This oxygen-scavenging action protects the oxygen-sensitive nitrogenase enzyme, enabling effective biological fixation of atmospheric nitrogen by Rhizobium bacteria.

55. (A) P-2, Q-3, R-4, S-1
Leguminous species form host-specific symbiotic ties with Rhizobium strains. Soybean pairs with Rhizobium japonicum, Berseem pairs with Rhizobium trifolii, Chickpea requires Rhizobium ciceri, and Pea pairs with Rhizobium leguminosarum. Applying the correct species-specific biofertilizer inoculant ensures maximum nodulation and effective atmospheric nitrogen fixation in target crops.

56. (A) Enhancing biological cycles within the farming system to maintain soil health
Organic farming is a holistic production management system that relies on ecological processes, biodiversity, and natural cycles adapted to local conditions. Its fundamental principle is enhancing biological soil activity, recycling organic wastes, and maintaining long-term soil health using natural inputs, while strictly avoiding synthetic chemical fertilizers, pesticides, and genetically modified organisms.

57. (B) Earthworms
Vermicompost is a high-quality organic biofertilizer produced through the bio-degradation of organic waste materials by earthworms, such as Eisenia fetida. Earthworms ingest organic waste, fragment it internally, and excrete nutrient-rich casts populated with beneficial soil microbes, enzymes, and plant-available macronutrients, significantly enhancing soil structure and fertility.

ANSWERS

1. (A) High dependence on monsoon rainfall and a large proportion of marginal farmers
Indian agriculture at the macro level is primarily defined by a high structural reliance on seasonal monsoon precipitation and a predominance of small and marginal landholdings. Most farmers operate small land parcels with limited resource access, making agricultural productivity vulnerable to climate variability, rainfall fluctuations, and inadequate irrigation infrastructure across major agrarian states.

2. (C) The Western Ghats and North-Eastern hilly regions
Plantation crops such as tea, coffee, and rubber require humid tropical climates, high rainfall, well-drained undulating slopes, and frost-free conditions. The Western Ghats and North-Eastern hilly regions provide ideal agro-climatic conditions, including suitable elevation, acidic fertile soil, and abundant precipitation, making these hill tracts the primary commercial plantation hubs in India.

3. (A) More people engaged in agricultural work than actually required for optimum production
Disguised unemployment occurs when more workers are employed in an economic activity than necessary for maximum output. In Indian agriculture, family members often work on small ancestral land parcels due to limited non-farm employment options. Consequently, the marginal physical productivity of extra workers is effectively zero, as overall agricultural output remains unchanged if they are removed.

4. (D) High population pressure on land causing intensive use of biochemical inputs and irrigation
Intensive subsistence farming is practiced in regions with heavy population density on limited agricultural land. Due to high demographic pressure and small landholding sizes, farmers apply substantial amounts of biochemical inputs, commercial chemical fertilizers, modern pesticides, and intensive artificial irrigation to maximize crop yield per unit area and support local household consumption demands.

5. (B) Sugarcane is exclusively grown in the southern states of India due to the tropical climate.
Sugarcane is not restricted to southern India; it is extensively cultivated across both tropical and sub-tropical belts in India. Sub-tropical states like Uttar Pradesh contribute a major share of total domestic sugarcane acreage and production. Although southern states benefit from tropical climates that yield higher sucrose content, northern plains remain major traditional producers.

6. (C) Odisha
The initial phase of the Green Revolution in the late 1960s targeted high-yield wheat production in regions with established canal networks and tube-well irrigation infrastructure. Punjab, Haryana, and Western Uttar Pradesh were the main beneficiary regions that experienced rapid agricultural growth. Eastern states such as Odisha were not part of this core primary Green Revolution focus area.

7. (D) Producing agricultural crops primarily for sale in commercial markets
Commercial farming focuses on raising crops and livestock specifically for sale in open commercial markets to generate financial profit. Unlike subsistence farming, which aims to feed the farmer household, commercial agriculture utilizes modern technology, high-yielding seed varieties, agrochemicals, large land tracts, and capital investments to maximize marketable surplus and financial returns from agricultural operations.

8. (A) A form of commercial farming where a single crop is grown on a large area
Plantation agriculture is a specialized form of commercial farming characterized by growing a single cash crop on extensive land estates. It requires large capital investments, modern management, processing units near estates, and extensive labor. Common plantation crops include tea, coffee, rubber, sugarcane, and banana, grown primarily for sale in national and international commercial markets.

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28. (C) A restorative crop like pulse or green manure
Exhaustive crops such as sugarcane, sorghum, or maize extract large quantities of macronutrients from the soil, leaving it depleted. Following them with restorative crops like pulses or green manure crops rebuilds soil organic matter and restores nitrogen balance. Leguminous restorative crops naturally fix nitrogen and improve soil structure, counteracting nutrient exhaustion.

29. (D) Potato followed by Radish
Rotating potato with radish is considered a poor agronomic practice because both are heavy nutrient-consuming root or tuber crops that draw nutrients heavily from similar soil depths. Furthermore, consecutive root crops can promote soil-borne diseases, pest buildup, and soil compaction. Scientifically, root crops should be rotated with foliage or leguminous crops.

30. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Leguminous crops improve soil health because they host symbiotic Rhizobium bacteria in root nodules that fix atmospheric nitrogen into plant-available forms. This natural biological nitrogen fixation enriches soil nitrogen reserves, enhances organic content, and improves soil physical structure, making the biological mechanism the exact scientific explanation for the observed soil health improvement.

31. (B) Integrating crop cultivation with livestock rearing on the same farm
Mixed farming is an integrated agricultural system where crop production is combined with livestock rearing on the same farm. The components complement each other, as crop residues and forage provide food for farm animals, while animal manure enriches soil organic matter and fertility, diversifying income streams and mitigating agricultural operational risks.

32. (D) Sowing the seeds of the succeeding crop before the harvesting of the preceding crop
Relay cropping is a multiple cropping technique where the next crop is sown into the standing field crop before it is harvested. This overlap ensures continuous land coverage, maximizes annual heat and light utilization, conserves residual soil moisture, and allows double or triple cropping in regions with short post-harvest planting windows.

33. (A) Mixed cropping broadcasts mixed seeds without distinct rows, while intercropping uses a definite row pattern.
Both mixed cropping and intercropping involve growing two or more crops simultaneously in the same field. However, in mixed cropping, seeds are mixed together and sown without a specific row geometry. In contrast, intercropping maintains a distinct, systematic row arrangement, allowing independent weed control, chemical application, and efficient harvesting of each crop.

34. (C) It acts as an insurance against total crop failure due to adverse weather or pests.
For marginal farmers operating with limited financial security, mixed cropping provides vital risk management against total income loss. Because different crop species vary in their resistance to drought, excessive rainfall, pests, and diseases, the failure of one crop under unfavorable weather conditions is buffered by the survival of another, ensuring baseline food and income.

35. (A) Plantation agriculture in tropical regions like Kerala
Multi-tier cropping involves growing crops of different canopy heights simultaneously on the same plot to optimize vertical space and sunlight utilization. This system is widely practiced in tropical plantation setups, such as in Kerala, where tall coconut trees form the top canopy, pepper vines or coffee occupy the middle tier, and ginger or herbs grow at ground level.

36. (D) Cropping Intensity
Cropping intensity measures how efficiently land is utilized over a year in multiple cropping systems. Calculated as the ratio of gross cropped area to net sown area expressed as a percentage, higher cropping intensity indicates that the same physical land plot is cultivated multiple times across different cropping seasons within a single agricultural year.

37. (B) Sugarcane
Uttar Pradesh holds a commanding lead in Indian agriculture regarding sugarcane production and acreage. The state's vast alluvial plains, fertile soil conditions, extensive canal network, and favorable subtropical climate make sugarcane a dominant commercial cash crop, supplying raw material to hundreds of sugar mills and

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Andhra Pradesh to cultivate up to three paddy crops annually, known locally as Aus, Aman, and Boro.

19. (A) Short-day plants
Kharif crops require long day lengths during their initial vegetative growth phase and shorter day lengths with longer dark periods to trigger flowering and reproduction. Consequently, they are physiologically categorized as short-day plants. As day length shortens during late summer and autumn, these crops shift from vegetative development to reproductive development before harvesting.

20. (B) I, II and IV
Crop rotation involves growing different crop species in planned sequences on the same land over time. This practice improves soil fertility, breaks pest and pathogen life cycles, and reduces weed buildup by altering environmental conditions. However, crop rotation does not eliminate the need for irrigation, as crops still require adequate soil moisture for growth.

21. (B) Growing different crops in a planned sequence on the same plot of land over time
A crop cycle or crop rotation is the systematic practice of cultivating a series of different crop types in a predefined sequence on the same piece of agricultural land over multiple growing seasons. This scientific approach optimizes soil nutrient usage, minimizes pest and disease accumulation, and prevents soil degradation associated with continuous monoculture.

22. (C) To sustain land productivity and minimize ecological degradation
A scientifically planned crop cycle aims to maintain long-term soil health, preserve soil organic structure, and sustain crop productivity. Rotating crops with varying nutrient requirements, rooting depths, and biological characteristics prevents specific nutrient depletion, reduces pest outbreaks, limits soil erosion, and minimizes dependency on chemical inputs, thereby protecting agricultural ecosystems from degradation.

23. (D) Different crops have varied weed associations, preventing any single weed species from dominating the field
Weed species generally adapt to specific crop management practices, growth habits, and seasonal conditions. Rotating different crops alters tillage schedules, canopy shading, root environments, and cultivation practices, disrupting weed growth cycles. This variation prevents weed species tailored to a single crop from establishing dominant populations, thereby simplifying weed management across cropping seasons.

24. (A) It allows the soil to naturally recover its structural integrity and moisture.
Including a fallow period in a crop cycle means leaving arable land uncultivated for a season or year. This practice allows natural biological, chemical, and physical processes to restock soil nutrients, restore organic matter, rebuild crumb soil structure, and accumulate conserved soil moisture, ultimately improving land productivity for subsequent crop cultivation cycles.

25. (A) P-4, Q-3, R-2, S-1
Monoculture refers to growing the same crop repeatedly on the same land. Multiple cropping involves raising two or more crops sequentially in a year. Mixed cropping is growing two or more crops simultaneously without distinct row arrangements. Intercropping is growing two or more crops simultaneously in specific row arrangements to optimize resource use.

26. (B) A shallow-rooted crop
Agronomic principles dictate following deep-rooted crops with shallow-rooted crops in rotation. Deep-rooted crops extract water and minerals from lower subsoil strata, while shallow-rooted crops absorb nutrients primarily from upper soil layers. This alternating root distribution prevents continuous depletion of specific soil horizons, optimizes nutrient uptake throughout the soil profile, and improves overall structural stability.

27. (A) Legumes help in restoring the nitrogen depleted by the non-leguminous crop.
Non-leguminous grain crops like wheat and rice consume substantial amounts of soil nitrogen during growth. Following these exhaustive crops with leguminous plants helps restore soil nitrogen naturally. Legumes form symbiotic associations with Rhizobium bacteria in their root nodules, fixing atmospheric nitrogen into the soil, thereby enriching fertility and reducing synthetic fertilizer requirement.

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(A) 10
(B) 14
(C) 17
(D) 21

165. Read the following statements of Assertion (A) and Reason (R) carefully and select the correct option:
Assertion (A): Continuous and excessive use of nitrogenous fertilizers like Ammonium Sulphate over a long period makes the soil increasingly acidic.
Reason (R): The ammonium ions undergo nitrification, releasing hydrogen ions into the soil solution.
(A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
(B) Both Assertion (A) and Reason (R) are true but R is not the correct explanation of A.
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

166. In the context of natural pest and weed management, 'Collego' and 'DeVine' are well-known examples of:
(A) Synthetic toxic chemical rodenticides
(B) Plant-derived organic botanical insecticides
(C) Bio-herbicides (mycoherbicides)
(D) Broad-spectrum synthetic systemic fungicides

167. What is 'Vermiwash' in the context of organic farming?
(A) The physical pre-treatment process of thoroughly washing live earthworms in clean water before using them
(B) A highly toxic defensive biochemical substance secreted in mass quantities by dying or injured earthworms
(C) A complex motorized mechanical separation machine used to extract live worms from mature vermicompost beds
(D) The nutrient-rich liquid extract collected after the passage of water through a column of worm action

168. If a farmer grows Paddy in Kharif, Wheat in Rabi, and leaves the land fallow in Zaid, what is the cropping intensity for that year? (Assuming the whole farm area is sown both times)
(A) 100%
(B) 150%
(C) 200%
(D) 300%

169. To ensure the authenticity of organic agricultural produce in the domestic market, the FSSAI has introduced which specific logo?
(A) Agmark Certification
(B) Jaivik Bharat
(C) Green Eco-Mark
(D) Standard ISI Mark

170. Ultimately, what is the overarching goal of adopting sustainable agricultural systems and scientific crop cycles in modern India?
(A) To maximize immediate short-term agricultural economic profits regardless of long-term environmental degradation costs
(B) To meet current food needs while ensuring that future generations' ability to meet their needs is not compromised
(C) To strictly abandon modern agronomy and revert entirely to pre-historic primitive hunter-gatherer society models
(D) To centralize and nationalize all private farming operations under massive state-managed government corporations

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supporting the rural agrarian economy statewide.

38. (C) The Ganga-Yamuna Doab
The Ganga-Yamuna Doab in Uttar Pradesh features deep, highly fertile alluvial soils, favorable winter temperatures, and well-established canal and tube-well irrigation systems. These ideal physical and agricultural infrastructure conditions make the Doab region the most productive wheat-growing belt in the state, yielding superior agricultural productivity per hectare compared to other zones.

39. (D) Spring and Autumn
Sugarcane in Uttar Pradesh is primarily planted in two distinct seasons: Spring (February to March) and Autumn (October to November). Autumn planting generally yields higher cane weight and sugar recovery due to a longer growth duration, whereas spring planting is widespread as it fits conveniently into rotations after winter crop harvests.

40. (A) I and II only
Paddy is the principal Kharif cereal crop in Uttar Pradesh, extensively grown in the high-rainfall eastern and central fertile alluvial regions. Paddy requires clayey or clay-loam soils with high water retention capacity and standing water, making statement III incorrect because well-drained sandy soils with low water holding capacity are unsuitable for paddy cultivation.

41. (B) High water table and fertile alluvial soil
The Tarai region lying along the Himalayan foothills in Uttar Pradesh is characterized by rich alluvial deposits, heavy annual rainfall, and a naturally high water table. These hydrological and soil conditions provide continuous moisture and fertile land, creating an exceptional ecological environment for water-intensive cash and food crops like sugarcane and paddy.

42. (B) Red rot
Red rot, caused by the fungal pathogen Colletotrichum falcatum, is known as the "cancer of sugarcane." It causes extensive internal stalk reddening, tissue wilting, and juice souring, leading to massive crop losses across sugarcane-growing belts in Uttar Pradesh and severely impacting farmers and sugar processing industries.

43. (B) 20 to 25 degree Celsius
Wheat seed germination requires moderate soil temperatures for optimal enzymatic activity and radicle emergence. In Uttar Pradesh, the ideal temperature range during November sowing is 20 to 25 degrees Celsius. Extremely cold temperatures delay germination, while higher temperatures reduce germination percentage and early seedling vigor, affecting root system establishment.

44. (C) Wheat
PBW 343 and HD 2967 are popular high-yielding and disease-resistant varieties of wheat grown widely across North India, including Uttar Pradesh. Developed by agricultural research institutions, these semi-dwarf varieties offer strong tillering capability, high rust resistance, and high grain yields under irrigated high-input management conditions.

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45. (A) II, I, IV, III
Continuous monoculture repeatedly depletes specific nutrients from the root zone first. This nutritional imbalance leads to reduced soil microbial activity and organic matter breakdown. Consequently, soil structural integrity degrades, increasing compaction, which ultimately causes a overall decline in crop yields despite continued synthetic chemical fertilizer applications.

46. (C) Nutrient mining
Nutrient mining refers to the continuous extraction and removal of specific essential plant nutrients from the soil by growing the same crop repeatedly without adequate replenishment through balanced fertilization or organic inputs. Over time, this practice exhausts soil fertility, damages nutrient ratios, and leads to severe productivity declines in intensive cropping systems.

47. (B) They break hardpans in the subsoil and improve soil aeration and drainage.
Tap-rooted crops like mustard and pigeon pea possess deep, strong root systems that physically penetrate dense subsoil layers and compacted hardpans. As these roots decay, they leave continuous vertical channels, effectively performing biological subsoiling that enhances soil aeration, improves deep water infiltration, and facilitates root penetration for subsequent crops in rotation.

productivity during early plantation stages while establishing timber crops efficiently.

68. (D) Trees, pasture/forage crops, and livestock
A silvipastoral system is an agroforestry practice that deliberately integrates woody perennials (trees or shrubs) with pasture grasses, forage plants, and livestock on the same land unit. Trees provide shade, fodder, and timber, while forage supports animal production, creating ecological synergy, improving soil organic matter, and offering diversified income for rural farmers.

69. (B) Agrisilviculture
Agrisilviculture is an agroforestry branch defined as the deliberate combination of agricultural food or cash crops with forestry trees on the same land management unit. This spatial or temporal integration optimizes land use, enhances soil physical properties, diversifies farm production with timber and food, and protects microclimates from environmental degradation.

70. (C) It acts as a carbon sink and helps in microclimate moderation.
Integrating trees into agricultural landscapes through agroforestry creates significant ecological benefits. Perennial trees sequester atmospheric carbon in timber biomass and root systems, acting as carbon sinks. Furthermore, tree canopies act as windbreaks, moderate microclimate temperatures, reduce evapotranspiration losses from adjacent crops, and prevent topsoil erosion caused by heavy rains.

71. (D) Poplar
Poplar (Populus deltoides) is a fast-growing deciduous tree widely integrated with field crops like wheat, sugarcane, and mentha in Western Uttar Pradesh and Punjab. Because poplar sheds its leaves during winter, winter crops receive adequate sunlight, making it commercially suitable for farm forestry and agroforestry plywood industries.

72. (A) Allelopathy
Allelopathy refers to the biological phenomenon where an organism, such as certain tree species, releases chemical biochemical compounds (allelochemicals) into the surrounding environment via root exudates, leaf leachates, or volatilization. These natural chemicals inhibit or stimulate the germination, root growth, and development of nearby agricultural plants or competing weeds.

73. (B) M.S. Swaminathan
Professor M.S. Swaminathan is recognized as the Father of the Green Revolution in India. As an eminent geneticist and administrator, he collaborated with Nobel laureate Dr. Norman Borlaug to introduce high-yielding dwarf Mexican wheat varieties, leading nationwide agricultural strategy shifts that transformed India from food deficiency to self-sufficiency during the late 1960s.

74. (B) Mexico
The high-yielding semi-dwarf wheat varieties that spearheaded India's Green Revolution were originally developed in Mexico by Dr. Norman Borlaug at CIMMYT. Varieties such as Sonora 64 and Lerma Rojo 64 possessed dwarf genes that prevented lodging under heavy fertilization, allowing significant yield increases when introduced to Indian farms.

75. (A) I → II → III → IV
The Green Revolution began in the late 1960s (1966-67). Operation Flood (White Revolution) was launched in 1970 to increase milk production. NABARD was established by an Act of Parliament in 1982 to fund rural development. The Pradhan Mantri Fasal Bima Yojana (PMFBY) was introduced in 2016 for crop insurance.

76. (C) Severe depletion of groundwater tables and soil salinization
Intensive agricultural practices introduced during the Green Revolution in North-Western India required heavy tube-well groundwater extraction for rice-wheat cropping. Over-pumping led to falling groundwater tables. Concurrently, excessive surface irrigation, poor drainage, and chemical fertilizer overuse caused widespread soil salinization, waterlogging, and soil fertility degradation across Punjab, Haryana, and Western UP.

77. (D) HYV seeds, chemical fertilizers, pesticides, and assured irrigation
The Green Revolution relied on a synchronized high-input technological package. High-yielding semi-dwarf seed varieties required substantial amounts of inorganic chemical fertilizers (NPK) to express their yield potential, alongside synthetic

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58. (B) Free-living nitrogen-fixing biofertilizer
Azotobacter is a free-living, non-symbiotic aerobic bacterium found in soils that fixes atmospheric nitrogen into ammonium forms available to non-leguminous plants like wheat, maize, and mustard. Used widely as a biofertilizer seed or soil inoculant, Azotobacter also secretes plant growth-promoting hormones like auxins and gibberellins that enhance root development.

59. (A) Sikkim
Sikkim achieved the historic distinction of becoming the world's first fully organic state in 2016. The state government phased out synthetic chemical fertilizers and imported agrochemicals completely, converting all agricultural land to certified organic farming practices to protect fragile mountain ecosystems, preserve soil health, and promote eco-tourism and sustainable rural livelihoods.

60. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
During conversion from chemical to organic farming, crop yields often decrease temporarily because synthetic nutrient feeds are stopped immediately while natural soil biology takes time to recover. Rebuilding native soil microbial populations, soil organic carbon, and natural nutrient cycling mechanisms takes several seasons, explaining the initial conversion yield drop.

61. (D) They release nutrients slowly and improve soil structure over time.
Organic manures, such as farmyard manure and compost, contain lower concentrations of primary nutrients compared to synthetic fertilizers, but they release nutrients gradually as organic matter decomposes. Moreover, organic manures add humus to the soil, improving physical aeration, water-holding capacity, microbial diversity, and overall soil aggregation over long periods.

62. (C) Tube wells
Tube wells represent the largest single source of irrigation in Uttar Pradesh, accounting for over 70% of the state's total net irrigated area. Both private and government tube wells tap extensive deep alluvial aquifers across the Indo-Gangetic plains, offering reliable, direct groundwater access to farmers for year-round agricultural cropping.

63. (B) The ratio of crop yield produced to the amount of water consumed by the crop
Water Use Efficiency (WUE) is an agronomic metric defined as the yield of marketable economic product produced per unit volume of water consumed by the crop through evapotranspiration and field application. Maximizing WUE involves optimizing irrigation scheduling and application methods to yield higher crop output while minimizing water losses.

64. (D) Crown Root Initiation (CRI) stage
Crown Root Initiation (CRI), occurring around 20 to 25 days after sowing, is the most critical irrigation stage for wheat. During CRI, adventitious crown roots develop, anchoring the plant and forming the structural base for tillering. Water stress during CRI causes permanent yield loss by severely limiting tiller development and head formation.

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65. (A) Bridge the gap between irrigation potential created and irrigation potential utilized
The Command Area Development (CAD) programme was launched in 1974-75 to optimize agricultural production in irrigated commands. Its primary objective was bridging the widening gap between created irrigation potential from major/medium dams and actual field utilization, through on-farm water management, land levelling, field channel construction, and rotational water distribution system implementation.

66. (C) Protect the crop from severe moisture stress during dry spells
Protective irrigation aims to safeguard standing crops against moisture stress and yield collapse during extended dry spells or monsoon failures, rather than supplying full crop water requirement for maximum yield. It ensures crop survival and basic yield stability over wider rainfed agricultural areas using limited stored or harvested water resources.

67. (A) Raising agricultural crops along with forest plantation during the early years of tree establishment
The Taungya system is a traditional agroforestry practice where landless farmers are permitted to grow short-duration agricultural crops alongside newly planted forest tree saplings. Farmers manage the land and protect young trees until the forestry canopy closes, optimizing land

9. (B) Jhumming
Shifting cultivation is a primitive subsistence agricultural method where forest patches are cleared by slashing and burning vegetation to plant crops. After soil fertility declines, farmers abandon the plot to clear new forest land. In the North-Eastern states of India, including Assam, Meghalaya, Mizoram, and Nagaland, this traditional farming system is locally called Jhumming.

10. (B) I and III only
Subsistence farming relies heavily on manual family labor, animal power, and traditional tools due to small landholdings. In contrast, commercial farming utilizes modern heavy machinery, intensive capital, high-yielding variety seeds, and chemical inputs to maximize yield per hectare. Therefore, commercial farming features higher mechanization than subsistence farming, making the second statement incorrect while others remain valid.

11. (A) High capital investment and large landholdings
Commercial farming is distinguished from subsistence agriculture by its reliance on extensive capital investment, large consolidated landholdings, advanced machinery, and synthetic inputs. The primary objective is to maximize crop production for sale in commercial markets, requiring significant financial resources for machinery, chemical fertilizers, quality seed varieties, and hired labor needed for large-scale operations.

12. (C) Cotton
Cotton is grown predominantly as a commercial fiber cash crop intended for industrial processing and market sale rather than domestic consumption. Millets such as pearl millet, finger millet, and sorghum are traditionally cultivated as subsistence food grains and fodder crops, particularly in semi-arid regions where smallholder farmers rely on them for household food security.

13. (D) June to July
Kharif crops are monsoon crops sown during the onset of the southwest monsoon season, typically in June and July across most parts of India. These crops rely on warm temperatures and abundant rainfall for early vegetative growth, and they are subsequently harvested in the autumn months from September to October as the monsoon season concludes.

14. (C) Mustard
Mustard is a winter-season oilseed crop cultivated as a Rabi crop in India. Rabi crops are sown in autumn, usually from October to December, and harvested in spring from March to April. Paddy, maize, and cotton are Kharif crops sown during the summer monsoon months, requiring higher temperatures and continuous soil moisture throughout growth.

15. (B) Short-duration crops such as watermelons, melons, and cucumbers
Zaid is a short summer cropping season between the Rabi harvest and Kharif sowing, running mainly from March to June. Crops grown during Zaid are fast-growing, warm-weather plants, predominantly including cucurbits like watermelons, muskmelons, cucumbers, and gourds, along with short-duration vegetables and fodder crops that thrive under warm conditions with irrigation support.

16. (D) Barley - Zaid
Barley is a Rabi crop sown in the winter months of October to December and harvested during spring. It requires cool weather during its vegetative growth phase and dry warm conditions during grain ripening. It is not a Zaid crop; Zaid crops are fast-maturing summer crops like watermelons and cucumbers cultivated between March and June.

17. (A) Baisakhi
Baisakhi is a traditional spring harvest festival celebrated predominantly in North India, especially Punjab and Haryana. It marks the successful maturation and harvesting of Rabi winter crops, particularly wheat. Celebrated in mid-April, Baisakhi signifies agrarian prosperity and reflects the completion of the winter cropping cycle before summer field preparation begins for Kharif crops.

18. (C) Due to warm year-round temperatures and assured irrigation facilities
Southern and eastern coastal regions experience mild, warm winter temperatures and frost-free weather throughout the year. Coupled with assured irrigation facilities and monsoons, these favorable climatic conditions allow farmers in states like Tamil Nadu, West Bengal, and

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chemical pesticides for pest management and guaranteed, timely artificial irrigation, radically increasing crop production in suitable regions.

78. (C) Wheat
Wheat recorded the most dramatic growth in production and productivity during the initial phase of the Green Revolution in India. Introduced semi-dwarf high-yielding Mexican wheat varieties responded exceptionally well to irrigation and chemical fertilizers, causing a production surge termed the "Wheat Revolution," which stabilized national food security during the late 1960s.

79. (B) Moving away from mono-cropping to growing a variety of crops
Crop diversification involves reallocating agricultural land from single monoculture cropping systems towards cultivating multiple diverse crops with varying nutrient needs, growing seasons, and market values. This strategy reduces economic reliance on a single commodity, enhances soil biological fertility, mitigates climatic risk, and improves overall farm operational stability and revenue.

80. (C) III only
Crop diversification helps mitigate income risk from crop failure or price dips and restores soil health degraded by repetitive rice-wheat cycles. Statement III is incorrect because crop diversification does not eliminate the need for Minimum Support Price (MSP), which remains an important policy tool to provide floor prices and income security for diverse crops.

81. (A) Millets, Pulses, and Oilseeds
Agronomists advocate shifting land away from water-intensive summer paddy in Punjab and Haryana towards millets, pulses, and oilseeds. These alternative crop choices consume substantially less water, possess lower carbon footprints, improve soil health through nitrogen fixation or organic matter addition, and help arrest rapid groundwater table depletion in the Indo-Gangetic plains.

82. (C) It disrupts the availability of host plants, breaking the life cycle of specialized pests.
Monoculture creates continuous abundance of specific host plants, allowing specialized insect pests and pathogens to build up massive populations over consecutive seasons. Cultivating diverse crops breaks this continuous host availability, creating spatial and temporal host gaps that naturally disrupt pest reproduction, lifecycle completion, and field-wide infestation severity without chemical dependence.

83. (A) Paddy
The Crop Diversification Programme (CDP) under Rashtriya Krishi Vikas Yojana focused specifically on replacing water-guzzling paddy with alternative crops like pulses, oilseeds, maize, and nutra-cereals in original Green Revolution states like Punjab, Haryana, and Western Uttar Pradesh to conserve declining groundwater resources and restore long-term soil health.

84. (D) Early forced maturity leading to shriveled grains and reduced yield
Rising terminal temperatures during March and April accelerate heat accumulation in wheat crops during grain filling. Excessive thermal stress foreshortens the grain development window, causing forced premature ripening. This accelerated senescence prevents full starch accumulation in kernels, resulting in shriveled grains, lower test weights, and substantial reduction in overall harvest yields.

85. (A) P-1, Q-2, R-3, S-4
Anaerobic decomposition in flooded paddy fields and livestock enteric fermentation produce methane gas. Synthetic nitrogen fertilizer application drives soil nitrous oxide emissions. Biomass residue burning and farm tractor machinery release carbon dioxide. Broadcasting urea on basic surface soils causes ammonia gas volatilization into the atmosphere.

86. (C) There will be a noticeable shift of crop cultivation zones towards higher latitudes and altitudes.
Global climate change and rising temperatures alter regional thermal and moisture regimes. Consequently, traditional cropping boundaries are shifting poleward toward higher latitudes and upward toward higher elevation altitudes, where previously cooler thermal conditions are becoming warm enough to support the seasonal growth cycles of major agricultural and horticultural crops.

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constitute a relatively small share (around 3-4%) of total geographical area.

126. (C) Israel
Modern drip irrigation technology was developed and commercialized in Israel during the 1960s by engineer Simcha Blass. Faced with extreme water scarcity and desert conditions, Israel pioneered precise micro-irrigation emitters that discharge water directly to plant root zones, transforming arid agricultural management globally through elevated water-use efficiency.

127. (B) Drip irrigation
Drip irrigation provides the highest water use efficiency among all irrigation methods, frequently attaining 90 to 95 percent efficiency. By delivering water slowly drop-by-drop directly into plant root zones through emitters, it minimizes surface runoff, deep percolation losses, and canopy evaporation, maximizing economic crop yield produced per drop of water applied.

128. (D) Fertigation
Fertigation is the process of injecting fully water-soluble chemical fertilizers directly into an irrigation system, primarily drip or sprinkler networks. This technique ensures precise placement of dissolved nutrients directly into the active root zone, improving nutrient absorption efficiency, reducing fertilizer leaching losses, and minimizing labor expenses compared to conventional broadcasting.

129. (A) Undulating or rolling terrain with sandy soils
Sprinkler irrigation is suited for undulating, rolling topographies where surface land levelling is economically unfeasible. It performs exceptionally well on highly permeable sandy soils with high infiltration rates, as overhead pressure spraying applies water uniformly like natural rain without causing severe surface runoff, soil erosion, or deep percolation losses.

130. (C) I, II and IV
The "Per Drop More Crop" component of PMKSY aims to increase water efficiency using micro-irrigation technologies like drip and sprinkler systems, alongside extension and training activities. Statement III is incorrect because the scheme does not ban canal irrigation; rather, it complements canal networks by improving farm-level water management and application efficiency.

131. (A) NABARD
A dedicated Micro Irrigation Fund (MIF) with an initial corpus was created under the National Bank for Agriculture and Rural Development (NABARD). The MIF assists state governments in mobilizing concessionary financial resources to expand micro-irrigation coverage, incentivize drip/sprinkler adoption, and implement special innovative water management projects.

132. (D) Particulate Matter (PM 2.5 and PM 10) and Black Carbon
Crop residue burning (stubble burning) in North-Western India releases vast quantities of fine air pollutants into the lower atmosphere during early winter. Combustion of paddy straw emits dangerous concentrations of Particulate Matter (PM 2.5 and PM 10), Black Carbon, carbon monoxide, and volatile organic compounds, producing hazardous smog conditions across the Indo-Gangetic plain.

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133. (B) It cuts standing stubble, sows wheat seeds, and deposits straw as mulch in a single pass.
The Happy Seeder is a tractor-mounted conservation agriculture implement used for in-situ paddy residue management. It cuts and lifts standing paddy straw, sows wheat seeds directly into bare soil without prior tillage, and deposits the shredded straw back over the sown seed row as protective surface mulch in a single operation.

134. (C) Nitrogen
Open burning of crop residues in agricultural fields causes near-complete loss of organic nitrogen content present in straw, as intense heat oxidizes nitrogen compounds into volatile gases released into the atmosphere. While minerals like potassium and phosphorus remain partially in residual ash, precious nitrogen and soil organic carbon are totally destroyed.

135. (D) Seven strains of fungi that accelerate the decomposition of paddy straw
Pusa Decomposer, developed by the Indian Agricultural Research Institute (IARI), is a bio-enzyme bio-fungal microbial consortium comprising seven identified fungal species. When sprayed as a liquid solution on crop straw in fields, these fungi secrete cellulolytic enzymes that digest plant cell walls, rapidly decomposing paddy straw in-situ into organic compost.

96. (B) 2015
The Soil Health Card Scheme was officially launched by the Government of India in February 2015 at Suratgarh, Rajasthan. The national scheme provides farmers with customized soil test report cards detailing nutrient status and recommended localized fertilizer application rates to optimize soil fertility and reduce unnecessary, unbalanced agrochemical usage across farming systems.

97. (C) 12
A standard Soil Health Card reports soil test parameters across twelve critical indicators. These comprise macro-nutrients (N, P, K), secondary nutrients (S), micro-nutrients (Zn, Fe, Cu, Mn, B), and physical/chemical parameters including soil pH, Electrical Conductivity (EC) measuring salinity, and Soil Organic Carbon (SOC) percentage.

98. (C) Dhaincha (Sesbania)
Dhaincha (Sesbania aculeata) is the most widely cultivated green manure crop in Uttar Pradesh. It grows rapidly, produces abundant green succulent biomass, tolerates waterlogging and mild salinity, and fixes substantial atmospheric nitrogen. Ploughed into the soil prior to planting paddy, it decomposes quickly, enriching soil organic matter and nitrogen availability.

99. (A) Pre-flowering to early flowering stage
Green manure crops like Dhaincha or Sunn hemp are ploughed into soil during their pre-flowering to early flowering stage (around 45 to 50 days after sowing). At this vegetative stage, plant tissues are succulent, leafy, nitrogen-rich, and contain low lignin content, promoting rapid microbial decomposition and maximum nutrient release for subsequent crops.

100. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Soil Organic Carbon (SOC) is the fundamental core indicator of overall soil quality and health. SOC binds soil particles into stable aggregates, improves soil porosity and water-retention capacity, and provides essential energy and carbon substrates for beneficial soil microorganisms, making the physiological mechanisms described the precise scientific explanation for SOC importance.

101. (B) Interdependent integration of various agricultural enterprises where the waste of one becomes the input for another
An Integrated Farming System (IFS) is an agro-ecosystem approach where multiple complementary farm enterprises—such as crop cultivation, livestock rearing, aquaculture, apiculture, and poultry—are integrated on a single farm. Waste products from one enterprise serve as primary inputs for another, maximizing resource recycling, reducing input costs, and optimizing overall farm productivity.

102. (C) Heavy industrial manufacturing
An Integrated Farming System integrates biological and agricultural activities on a farm, including crop production, animal husbandry, poultry, fish culture, agroforestry, and mushroom cultivation. Heavy industrial manufacturing is an off-farm industrial activity unrelated to farming ecosystem management and does not constitute a component of standard integrated farming models.

103. (D) By feeding on weeds and harmful insects, while their droppings act as fertilizer
In the integrated duck-rice farming system, ducks foraging in flooded paddy fields eat harmful insect pests like planthoppers and suppress aquatic weeds through grazing and paddling. Simultaneously, duck droppings voided directly into field water provide organic nutrient enrichment, while duck movement oxygenates water and stimulates paddy root system growth naturally.

104. (A) It assures a regular, year-round flow of income and reduces risk compared to mono-cropping.
Integrated Farming Systems are suitable for marginal and small farmers because enterprise diversification generates steady daily or weekly cash flows from livestock, milk, eggs, or vegetables, contrasting with seasonal single-crop market returns. Resource recycling cuts expensive input purchases, buffering small farmers against total financial loss if one component fails.

105. (B) Crop residues are used as livestock feed, and livestock manure is used to fertilize the crops.
The primary synergistic loop in crop-livestock integration involves recycling biomass resources within the farm. Inedible crop residues, cereal straw, and crop byproducts serve as nutritious

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nitrification, releasing free hydrogen ions into the soil solution, which increases soil acidity and lowers soil pH over time.

166. (C) Bio-herbicides (mycoherbicides)
'Collego' and 'DeVine' are commercial bio-herbicides (specifically mycoherbicides) formulated using fungal pathogens to control specific target weed species biological control. DeVine utilizes Phytophthora palmivora to control strangler vine, while Collego uses Colletotrichum gloeosporioides to control jointvetch in crops, offering eco-friendly alternatives to chemical herbicides.

167. (D) The nutrient-rich liquid extract collected after the passage of water through a column of worm action
Vermiwash is a liquid organic extract collected during vermicomposting, created as water slowly percolates through active earthworm burrows and organic substrates. Rich in dissolved nutrients, earthworm excretory secretions, plant growth hormones (auxins, gibberellins), micronutrients, and beneficial soil microbes, vermiwash is applied as a foliar spray or liquid soil fertilizer.

168. (C) 200%
Cropping intensity is calculated as (Gross Cropped Area / Net Sown Area) multiplied by 100. If a farmer cultivates the entire farm area in Kharif with Paddy and again in Rabi with Wheat, the gross cropped area becomes twice the net sown area, resulting in a cropping intensity of exactly 200 percent for that agricultural year.

169. (B) Jaivik Bharat
The Food Safety and Standards Authority of India (FSSAI) introduced the 'Jaivik Bharat' logo as an official certification mark for organic food products sold in domestic Indian markets. The logo distinguishes authentic organic produce certified under Participatory Guarantee System (PGS-India) or National Programme for Organic Production (NPOP) regulatory standards.

170. (B) To meet current food needs while ensuring that future generations' ability to meet their needs is not compromised
The ultimate objective of sustainable agriculture and scientific crop rotation is fulfilling current societal demands for food, fiber, and nutritional security while preserving ecological integrity. By restoring soil health, conserving water reserves, and maintaining biodiversity, these systems ensure that natural agricultural resource bases remain productive for future generations to meet their needs.

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periodic soil testing. The e-NAM platform functions as a unified national electronic market portal for agricultural trading across Mandis.

116. (D) Soil conditions including structure, pH, and nutrient content
Edaphic factors refer specifically to the physical, chemical, and biological properties of the soil that influence plant growth and agricultural productivity. Key edaphic variables include soil texture, structure, organic matter content, soil pH, moisture holding capacity, nutrient availability, electrical conductivity, and the composition of beneficial soil microbial populations.

117. (B) It accelerates soil erosion and makes mechanized farming difficult.
Steep slopes accelerate surface runoff during rainfall events, washing away fertile topsoil and causing severe sheet and gully erosion. Furthermore, steep topographies prevent the efficient deployment of modern farm machinery and heavy tractors, increasing manual operational costs and limiting overall land utilization and crop yields compared to flat plain terrains.

118. (C) Fragmentation and small size of landholdings
The continuous division and sub-division of land due to inheritance laws has led to extreme landholding fragmentation in Indian agriculture. Small, scattered land parcels make modern mechanization uneconomical, complicate efficient irrigation setup, increase operational transaction costs, reduce economies of scale, and significantly constrain smallholder agricultural productivity and net farm profitability.

119. (D) Marginal farmer
In official Indian agricultural classifications, operational landholdings are categorized based on size. A landholder operating an agricultural area of less than 1.0 hectare (2.47 acres) is designated as a Marginal farmer. Small farmers hold 1 to 2 hectares, semi-medium hold 2 to 4 hectares, while medium and large farmers hold larger acreage.

120. (A) I and II only
Institutional credit enables farmers to purchase quality inputs like seeds and fertilizers on time, while rural roads facilitate efficient product transport, reducing post-harvest losses. Statement III is incorrect because excessive, unbalanced nitrogenous fertilizer usage degrades soil structure, causes acidification, and reduces long-term soil productivity rather than permanently increasing it.

121. (B) Current fallow is uncultivated for up to 1 agricultural year, while old fallow is left uncultivated for 1 to 5 years.
In Indian land-use reporting, "Current Fallow" represents land left uncultivated during the current agricultural year (up to one year) to recover natural fertility. "Other Fallow" or "Old Fallow" denotes arable land left uncultivated for a period of more than one year but less than five consecutive agricultural years.

122. (B) To allow the soil to naturally rest, recuperate its fertility, and accumulate moisture
Traditional farmers intentionally leave land fallow between cropping cycles to allow natural physical, biological, and chemical restoration. Leaving soil undisturbed without crop cover allows natural organic matter accumulation, moisture conservation in subsoil layers, bacterial nutrient mineralization, and recovery of essential soil elements depleted by previous harvest cycles.

123. (A) Inclusion of short-duration leguminous crops or green manure in the crop cycle
With high demographic pressure making fallowing economically unfeasible, agronomists advocate incorporating short-duration leguminous pulses or green manure crops (like moong or dhaincha) into cropping gaps. These cover crops fix atmospheric nitrogen, build organic matter, and protect soil from erosion without leaving arable land idle or sacrificing crop intensity.

124. (C) Culturable waste
Land that is suitable for crop cultivation but left uncultivated for a continuous period exceeding five consecutive agricultural years is officially classified in land-use records as "Culturable Waste." Such land may be fallow or covered with scrub vegetation, requiring land reclamation, clearing, or soil treatment before being brought back into active cropping.

125. (A) I, II, III, IV
According to official land-use statistics in India, Net Sown Area forms the largest proportion (around 45%), followed by Forest Cover (around 23%). Barren and Unculturable Land occupies a smaller proportion (around 6-7%), while Permanent Pastures and Grazing Lands

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87. (D) To sustainably increase agricultural productivity, build resilience to climate change, and reduce emissions
Climate-Smart Agriculture (CSA) is an integrated approach to managing agricultural landscapes. Its primary objectives are sustainably increasing farm productivity and incomes, adapting and building ecosystem resilience to climate change impacts, and reducing or removing greenhouse gas emissions where possible, ensuring long-term national food security under evolving environmental conditions.

88. (A) Carbon fertilization effect
The carbon fertilization effect refers to the enhancement of photosynthetic rates and water-use efficiency in plants due to elevated atmospheric carbon dioxide concentrations. C3 crop plants, including wheat, rice, and soybeans, exhibit increased carbon assimilation and biomass growth under higher ambient carbon dioxide levels, provided water and soil nutrients are not limiting factors.

89. (B) Rabi crops
Unseasonal rainfall, strong winds, and hailstorms during March and April coincide with the mature ripening and harvesting stages of winter Rabi crops in Uttar Pradesh, such as wheat, mustard, chickpea, and barley. Physical hail impact and lodging cause grain shattering, field damage, fungal discoloration, and severe yield reductions just prior to harvest.

90. (B) I, II and III
Trap crops are planted to attract pests away from main cash crops, and target pest populations on them can be destroyed through localized sprays. Planting marigold near tomatoes attracts fruit borers and suppresses nematodes. Statement IV is incorrect because trap crops are planted primarily for pest suppression rather than higher commercial sale value.

91. (A) Pests usually have specific host-plant preferences, and removing the host starves the pest population.
Most specialized insect pests and plant pathogens rely on specific host-plant families for feeding, reproduction, and lifecycle survival. Rotating crops breaks host continuity by replacing target host species with non-host crops, effectively starving residual pest populations, preventing pest population buildup, and maintaining insect numbers below economic damage thresholds without synthetic chemicals.

92. (C) Planting a few rows of okra (Bhindi) around a cotton field to attract bollworms
Okra (Bhindi) belongs to the Malvaceae family alongside cotton and serves as a highly preferred host for bollworms. Planting okra rows as a border trap crop around commercial cotton fields draws female moths to lay eggs on the okra, protecting main cotton plants from damage and concentrating pest management efforts on trap rows.

93. (D) Marigold or Mustard
Marigold (Tagetes species) and mustard crops produce naturally bio-fumigant biochemicals; marigold roots release alpha-terthienyl, which inhibits root-knot nematodes, while mustard residues release glucosinolates. Incorporating these suppressive crops into agricultural crop rotations naturally reduces soil-borne parasitic nematode populations and improves biological soil health for susceptible cash crops.

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94. (C) Manipulation of farming practices like tillage, time of sowing, and crop rotation to reduce pest damage
Cultural pest control involves modifying routine farming practices to create an environment unfavorable to pest establishment, survival, and reproduction. Techniques include adjusting planting schedules to avoid peak insect emergence, deep summer plowing to expose pupae, weed host destruction, optimal crop spacing, and systematic crop rotation to reduce crop vulnerability without heavy reliance on chemicals.

95. (B) Expose soil-borne pests, pupae, and weed rhizomes to scorching solar heat and natural predators
Deep summer plowing during hot summer months inverted topsoil layers, exposing dormant soil-borne insect larvae, fungal spores, weed seeds, and perennial rhizomes to intense solar radiation and high temperatures. This solar heat desiccates weed structures and kills pest pupae, while exposing unearthed organisms to predatory birds, significantly lowering seasonal pest pressure naturally.

136. (A) Removing the residue from the field and using it for biomass power generation, bio-ethanol, or cardboard manufacturing
Ex-situ residue management involves collecting post-harvest crop straw from agricultural fields and transporting it away for off-farm industrial utilization. Harvested stubble is baled and utilized as industrial raw material for biomass pellet power generation, second-generation bio-ethanol fuel production, paper manufacturing, cardboard processing, compressed biogas generation, or animal fodder.

137. (B) NMSA
The National Mission for Sustainable Agriculture (NMSA) is one of the eight key missions under India's National Action Plan on Climate Change (NAPCC). NMSA aims to transform Indian agriculture into a climate-resilient production system by promoting location-specific integrated farming, soil health management, water conservation technologies, and resource-use efficiency.

138. (B) Cluster-based organic farming with PGS certification
Paramparagat Krishi Vikas Yojana (PKVY) was launched by the Ministry of Agriculture to promote traditional chemical-free organic farming. The scheme adopts a cluster-based approach, encouraging farmers to form groups for organic conversion, offering financial assistance for organic inputs, and utilizing Participatory Guarantee System (PGS-India) certification to facilitate domestic organic produce marketing.

139. (A) Ashok Dalwai
The Inter-Ministerial Committee on Doubling Farmers' Income was constituted by the Government of India under the chairmanship of Ashok Dalwai. The committee published a comprehensive multi-volume strategy report emphasizing structural agricultural reforms, post-harvest infrastructure creation, market access, risk management, climate resilience, and shifting focus from gross yield to net farm income.

140. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Open-ended procurement and guaranteed MSP for rice and wheat have incentivized farmers in Punjab and Haryana to continuously practice the rice-wheat cropping sequence. Because government agencies offer assured price returns for these staples, farmers avoid cultivating riskier pulses and oilseeds, making the economic policy mechanism the direct cause of distorted regional crop cycles.

141. (D) M.S. Swaminathan
The term "Evergreen Revolution" was coined and popularized by Professor M.S. Swaminathan. It emphasizes increasing agricultural productivity and yields per unit of land and water perpetually without causing ecological harm, soil degradation, or biodiversity loss, blending modern ecological principles and clean technology with traditional farming practices for sustainable food security.

142. (C) To double agricultural exports from the state and increase farmers' income
The Uttar Pradesh Agriculture Export Policy 2019 was formulated to boost agricultural trade from the state. Its primary goal is doubling agricultural export volumes, raising rural farm incomes, promoting export-oriented crop clusters, establishing cold chain logistics, standardizing quality parameters, and connecting local farmers directly to lucrative international markets.

143. (B) Sugarcane
Sugarcane is widely regarded as the economic lifeline for farming communities across Western and Central Uttar Pradesh. As a major commercial cash crop, it powers the state's rural economy, driving sugar mills, gur and khandsari units, and ethanol distilleries, while providing primary employment and direct income support to millions of agrarian households.

144. (D) Siddharthnagar
Under the One District One Product (ODOP) scheme of Uttar Pradesh, Kala Namak Rice—a traditional, highly aromatic, nutrient-rich black-husked non-basmati rice variety—is officially designated as the flagship product for Siddharthnagar district, located in the eastern Tarai belt, to preserve heritage rice agriculture and boost local farmer export revenues.

145. (A) P-2, Q-1, R-3, S-4
Under UP's ODOP scheme, Pratapgarh district is famous for Amla (Indian Gooseberry) processing. Muzaffarnagar is designated for Jaggery (Gud) production due to abundant sugarcane. Kaushambi district is recognized

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for Banana cultivation, while Gonda district is designated for Pulses processing and production.

146. (C) Sub-Mission on Agricultural Mechanization (SMAM)
The Uttar Pradesh government provides financial subsidies to establish Custom Hiring Centres (CHCs) primarily under the Sub-Mission on Agricultural Mechanization (SMAM). CHCs enable small and marginal farmers to rent expensive modern farm implements, heavy tractors, laser land levellers, and harvesters at subsidized hire charges, overcoming labor constraints and boosting operational efficiency.

147. (A) To provide financial assistance to farmers or their families in case of death or disability during agricultural work
The Mukhya Mantri Krishak Durghatna Kalyan Yojana, implemented by the Uttar Pradesh government, provides social security and financial compensation to farmers and their family members in the event of accidental death or permanent disability occurring during field farming or related agricultural operational work, ensuring safety nets for vulnerable agrarian households.

148. (A) First
Uttar Pradesh ranks first among Indian states in overall food grain production, contributing roughly 18 to 20 percent of the national total. The state's extensive fertile alluvial plains, favorable climate, and established irrigation networks drive major output in principal food crops including wheat, paddy, maize, and various pulse varieties.

149. (B) Sahbhagi Dhan
Sahbhagi Dhan is a prominent drought-tolerant rice variety developed through collaborative breeding efforts (ICAR-IRRI). Designed specifically for rainfed drought-prone upland environments, it maintains stable germination, robust root growth, and reliable grain yield under terminal water stress conditions where traditional susceptible paddy varieties suffer complete yield collapse.

150. (A) I and II only
Biofortification is the agronomic or genetic process of breeding crops to contain higher levels of essential vitamins, minerals, and proteins, directly reducing hidden hunger and micronutrient malnutrition in vulnerable populations. Statement III is incorrect because biofortification is achieved through plant breeding or biotechnology during growth, not by adding post-harvest chemical additives.

151. (D) Protein
CR Dhan 310 is a biofortified rice variety developed by ICAR-National Rice Research Institute (NRRI). It is distinguished by high grain protein content, averaging around 10.2% protein compared to standard traditional rice varieties containing 7-8%, helping combat protein-energy malnutrition in populations relying heavily on rice staples.

152. (A) Vitamin A
Golden Rice is a genetically modified rice variety engineered to synthesize provitamin A (beta-carotene) in the edible endosperm of the rice grain. It was created as a public health intervention tool to address widespread Vitamin A deficiency, which causes childhood blindness and immune deficiencies in developing nations where rice is the primary staple food.

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153. (B) Sub1A
The Sub1A gene, isolated from indigenous flood-tolerant rice landraces, confers submergence tolerance in paddy. When introgressed into popular high-yielding rice varieties (such as Swarna-Sub1), it enables plants to survive complete underwater submergence for up to two weeks by arresting elongation growth and conserving energy until floodwaters recede.

154. (B) Heat tolerance to withstand early onset of summer temperatures
HD 3385 is a high-yielding wheat variety developed by ICAR-IARI engineered with heat tolerance. It exhibits tolerance to elevated terminal temperatures during the grain-filling stage, allowing earlier sowing and preventing heat-induced forced maturity and grain shriveling caused by sudden early summer heat waves in North India.

155. (B) Germination → Tillering → Booting → Anthesis (Flowering) → Dough stage
Cereal crops like wheat progress through a structured phenological sequence. Sown seeds undergo germination first, producing initial roots and shoots. Seedlings then undergo tillering to produce additional stems. As reproductive heads

develop inside leaf sheaths, plants enter booting, followed by anthesis (flowering) for pollination, and conclude with the grain-filling dough stage before final harvest.

156. (C) Millets
The United Nations General Assembly declared the year 2023 as the International Year of Millets (IYM 2023), following a proposal sponsored by India. The initiative aimed to create global awareness regarding the nutritional benefits, climate resilience, drought tolerance, and low input requirements of nutra-cereals like sorghum, pearl millet, and finger millet.

157. (D) Fast-growing crop grown between two main crops when the regular crop fails or sowing is delayed
A catch crop is a fast-maturing, short-duration crop planted into a cropping sequence when a primary main crop has failed due to adverse weather or when main crop sowing is significantly delayed. Catch crops utilize residual soil moisture and nutrients to produce a quick emergency harvest or fodder before regular seasonal cropping resumes.

158. (C) Alternating arable crops with temporary sown pastures for resting the land and providing fodder
Ley farming is a sustainable agricultural system where arable cash crops are rotated in planned cycles with temporary sown pasture grasses or legumes (leys). The pasture phase rests the arable land, restores organic matter crumb structure, enriches soil nitrogen through legumes, controls soil erosion, and provides high-quality forage for farm livestock.

159. (B) In the first one-third of the crop's growing period
The critical period of crop-weed competition is the time window during crop growth when weeds cause maximum yield reduction if left unmanaged. For most annual field crops, this period falls within the first one-third of their total life cycle (typically 15 to 45 days after emergence), making early weed removal essential.

160. (B) I, II and III
Zaid is a short summer cropping season between Rabi and Kharif, requiring assured irrigation to cultivate fast-growing crops like watermelons, cucumbers, and vegetables. Statement IV is incorrect because Zaid is actually the shortest agricultural season in India, lasting only two to three months from March to June.

161. (A) Higher water use efficiency and heat tolerance than C3 plants
C4 plants, including maize, sorghum, and sugarcane, possess specialized Kranz leaf anatomy that minimizes photorespiration under intense light and high thermal conditions. Consequently, C4 plants exhibit higher photosynthetic rates, superior water-use efficiency, and enhanced heat tolerance compared to C3 plants like wheat and rice, producing more dry matter per unit of water transpired.

162. (C) Saves time, fuel, and reduces soil erosion while conserving moisture
Zero Tillage (No-Till) involves sowing crop seeds directly into unplowed soil retaining previous crop residues. Promoted across the Indo-Gangetic plains for wheat after paddy, it eliminates primary and secondary tillage passes, saving tractor fuel and turnaround time, while improving soil organic structure, conserving soil moisture, and reducing erosion.

163. (A) Sugarcane
Blind hoeing is a specialized weed control and soil crust-breaking practice associated with sugarcane cultivation. Carried out after planting but before cane sprouts emerge above ground, shallow hoeing breaks hard surface soil crusts caused by early rains, improving soil aeration for emerging buds while destroying newly germinating weed seedlings.

164. (C) 17
Modern plant nutrition science recognizes seventeen elements as essential for plant growth and completion of their life cycles. These include carbon, hydrogen, oxygen (from air/water), primary macronutrients (N, P, K), secondary macronutrients (Ca, Mg, S), and micronutrients (Fe, Mn, Zn, Cu, B, Mo, Cl, Ni), each fulfilling specific non-substitutable metabolic roles.

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165. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A.
Long-term continuous application of ammonium-based nitrogenous fertilizers like Ammonium Sulphate causes soil acidification. This occurs because soil nitrifying bacteria convert ammonium ions into nitrate through biological

livestock fodder, while livestock dung and urine are processed into organic compost or slurry to fertilize field crops, reducing chemical fertilizer dependencies and improving soil health.

106. (B) Subhash Palekar
Subhash Palekar, an Indian agriculturist, pioneered and popularized the concept of "Zero Budget Natural Farming" (ZBNF), now also known as Subhash Palekar Natural Farming. He developed this alternative farming methodology using native cow dung and urine formulations to eliminate commercial input costs and restore soil health without synthetic fertilizers or pesticides.

107. (A) Genetically Modified Seeds
Zero Budget Natural Farming is built on four core natural pillars: Jivamrita (microbial culture), Bijamrita (indigenous seed treatment), Acchadana (mulching soil with crop residues), and Whapasa (soil aeration and moisture management). Genetically modified seeds are synthetic commercial inputs and are strictly excluded from natural farming principles.

108. (C) Cow dung, cow urine, jaggery, pulse flour, and undisturbed soil
Jivamrita is a fermented microbial culture used in Zero Budget Natural Farming to stimulate soil biological activity. It is prepared by mixing fresh indigenous cow dung, aged cow urine, jaggery (unrefined sugar), pulse flour (dicot legume powder), and a handful of fertile, undisturbed forest soil in water, fermented over several days to multiply microflora.

109. (D) The condition where both air and water molecules are present in the soil, ensuring root aeration
Whapasa is the pillar of Zero Budget Natural Farming describing the optimal microclimate condition in the soil root zone where water vapor and air molecules coexist in equal balance. Natural farming emphasizes maintaining Whapasa rather than flooding soil, ensuring adequate oxygenation for root respiration, beneficial microbial metabolism, and efficient plant nutrient absorption.

110. (C) ZBNF eliminates purchased inputs using local resources like native cows, while organic farming allows costly certified inputs.
Zero Budget Natural Farming advocates using zero external purchased inputs, relying exclusively on farm-made natural formulations derived from indigenous cows and local vegetation to eliminate production costs. In contrast, certified commercial organic farming permits purchased external inputs, such as off-farm organic composts, commercial bio-pesticides, mined minerals, and specialized vermicompost.

111. (B) 2.0% of the sum insured
Under the Pradhan Mantri Fasal Bima Yojana (PMFBY), the insurance premium rate paid by farmers is capped at 2.0% of the total sum insured for all Kharif food and oilseed crops. The remaining actuarial premium cost is shared equally as a financial subsidy between the Central Government and respective State Governments.

112. (B) 1.5%
Under the Pradhan Mantri Fasal Bima Yojana (PMFBY), farmers pay a maximum fixed premium rate of 1.5% of the total sum insured for all Rabi food grain and oilseed crops. This minimal financial contribution ensures affordable crop insurance coverage against non-preventable natural risks, with remaining premium costs subsidized by governments.

113. (C) 5%
Under the Pradhan Mantri Fasal Bima Yojana (PMFBY), the maximum insurance premium rate payable by farmers for annual commercial crops and horticultural crops is capped at 5.0% of the sum insured. This structured rate provides financial safety against yields lost to natural calamities, severe weather, pests, and plant diseases.

114. (C) Malicious damage, theft, or nuclear risks
Pradhan Mantri Fasal Bima Yojana covers natural, non-preventable yield losses arising from drought, dry spells, floods, inundation, pests, diseases, landslides, natural fire, and localized hailstorms. However, avoidable risks such as intentional malicious damage, farm theft, crop grazing, war, and nuclear hazards are explicitly excluded from policy insurance compensation coverage.

115. (A) P-2, Q-4, R-3, S-1
PMFBY provides crop insurance coverage against natural risks. PMKSY focuses on expanding irrigation access and enhancing farm water use efficiency. Soil Health Card Scheme encourages rationalized fertilizer application based on

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